

*January* 1942

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



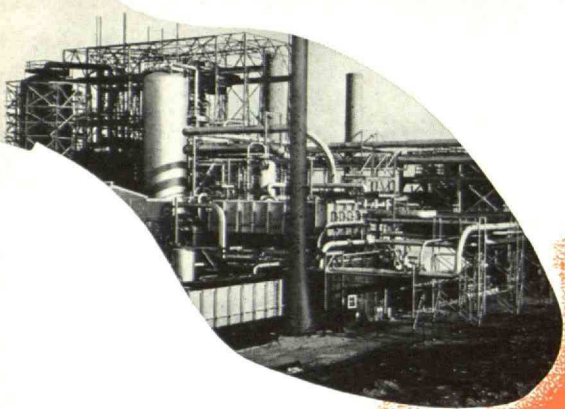


# technology review

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# A BACKWARD LOOK

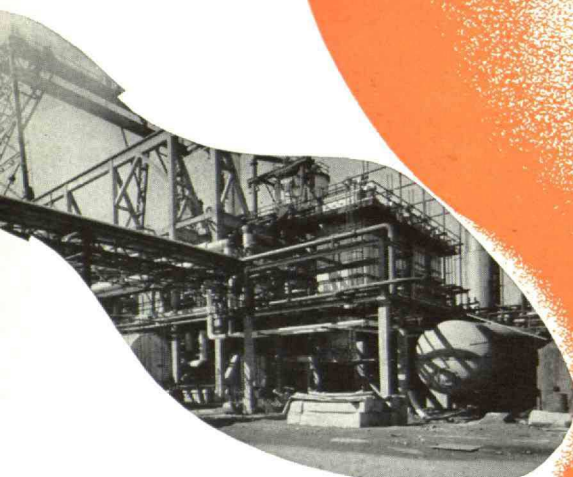
## *before a Forward Step*

Unforeseen developments . . . unhopd-for opportunities . . . unheard-of products . . . these are in store for the chemical processing industry.

But before any forward step is tried, a backward look should be taken at what has gone before . . . at the record of the engineering and construction organizations whose plants and units have made records for fast-starting and low-cost, efficient, dependable operation.

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## A Dark Picture of NATIONAL DEFENSE

A dark side of National Defense is that eye accidents are slowing up the vital production of planes, tanks, guns, ships. Last year *eye accidents* alone resulted in the loss of 8,455,000 man-days—a figure which is 30% greater than the time lost by strikes during the same period . . . a figure which is a national *disgrace*.

Do *your* part to make this picture *bright*. Protect all your workers, men and women, with safe, comfortable, American Goggles—goggles that have the *extra* impact-resisting protection of Deep-Curved Super Armorplate Lenses, ground, if desired, to individual prescriptions. Call in your nearest AO representative today.

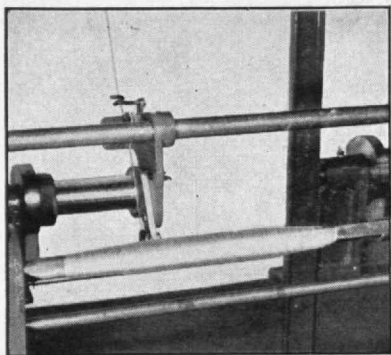
# American Optical Company

Southbridge



Massachusetts





# *New* **FIDELITY Quill Winder...**

## **Accurate Taper Winding of Wire for Weaving of Wire Cloth for**

### **• FILTERS • SCREENS • SIFTERS, etc.**

The new FIDELITY Quill Winder for accurate, high-speed taper winding of wire—six packages of uniformly even lay and taper at one time—speeds production for manufacturers of wire cloth for filters, screens, sifters, etc.

The taper is automatically governed by pressure control buttons which reverse and successively shorten the traverse in the same operation.

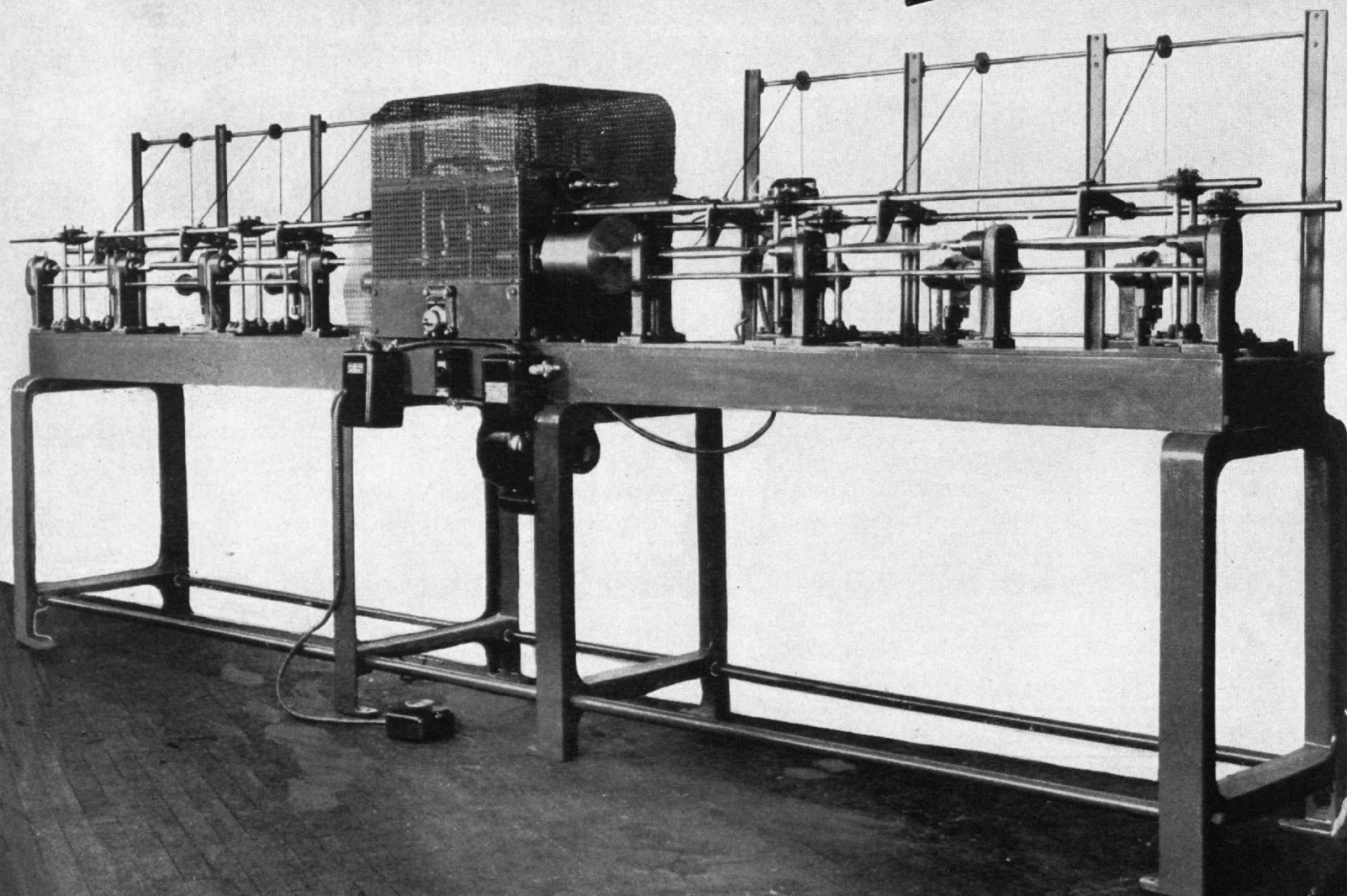
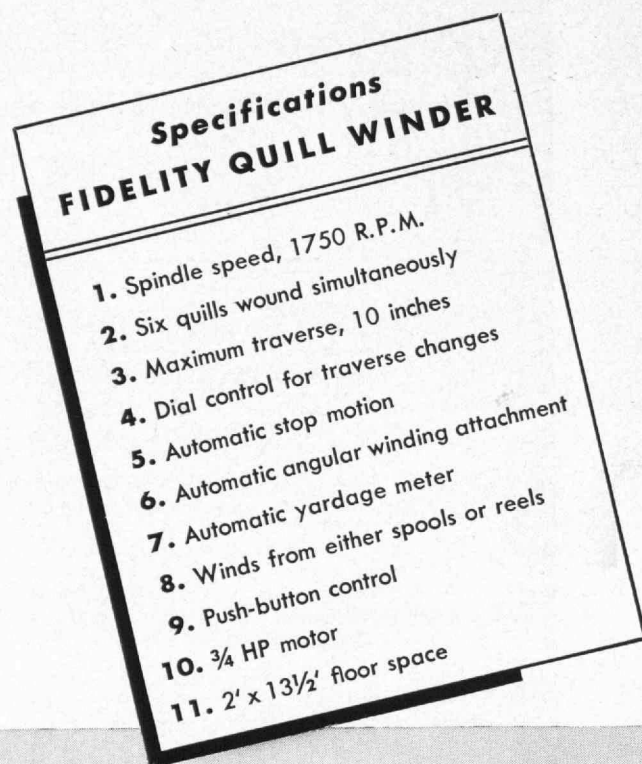
A clutch regulates tension to conform to speed and pick-up . . . eliminates wire breakage. Other outstanding advantages include: hydraulic control, individual motor drive, stop motion on feeder and winder, and automatic yardage meter.

You can wind wire from spools or brake-controlled reels depending on your requirements.

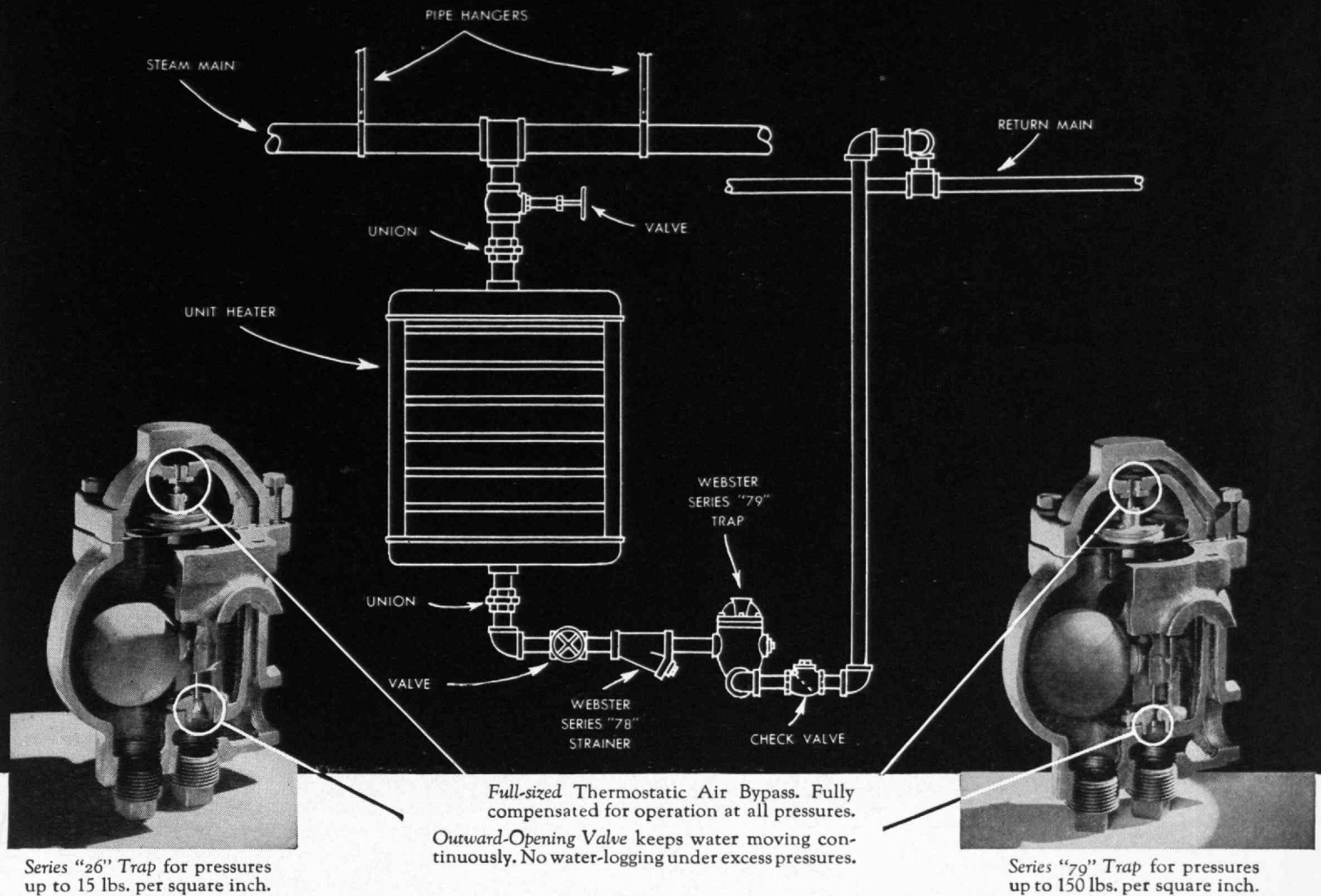
**For further information and details, write for Bulletin**

## **FIDELITY MACHINE COMPANY**

**3908-18 Frankford Avenue, Philadelphia, Pa.**







# -ideal for Unit Heaters

There is nothing intermittent in the operation of Webster Combination Float and Thermostatic Traps. . . They provide *continuous draining*. The float-controlled *outward opening valve* stays open as long as there is water present. Stepping up the pressure results in quicker heating up.

Then, consider overload capacity. When you have steam coming into a cold unit heater with a fan blasting cold air across it, the trap must handle a tremendous volume of condensation for a short time. Under this condition the generous thermostatic bypass of the Webster Combination Float and Thermostatic Trap plays an extra part . . . handling a substantial volume of condensation and only closing when the trap body is finally filled with saturated steam.

Air binding of unit heaters is unknown with Webster Combination Float and Thermostatic Traps. The full-sized thermostatic bypass insures continuous and immediate discharge of all the air and non-condensable gases that pass into the trap. The thermostatic element is no snap-action after-thought. It has the same capacity as the famous standard  $\frac{1}{2}$ " Webster Thermostatic Trap.

There are a score of other advantages . . . You will find them covered in detail in our catalog. But, try one on your next unit heater application. You'll be surprised and pleased. Pretty good deliveries, too—everything considered.

WARREN WEBSTER & COMPANY, CAMDEN, N. J.  
Pioneers of the Vacuum System of Steam Heating : : Est. 1888  
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H. F. MARSHALL '19

See our exhibit at the 7th International Heating and Ventilating Exposition, Commercial Museum, Philadelphia, Pa., January 26-30, 1942.

-since 1888  
**Webster**  
Systems of  
Steam Heating



## *Just for Fun!* A CHALLENGE TO YOUR INGENUITY

HERE is a simple problem that will not make you work too hard at this rushing season of the year. — Suppose that, in an election to fill 5 offices, each of 100 voters votes for 5 out of 10 candidates—a total of 500 votes being cast.

### VOTE FOR 5

A	B	C	D	E	F	G	H	I	J
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What is the largest number of votes a candidate could receive and still definitely lose?

What is the smallest number a candidate could receive and still definitely win?

*Answers: Eighty-two and eighteen.*

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## THE TABULAR VIEW

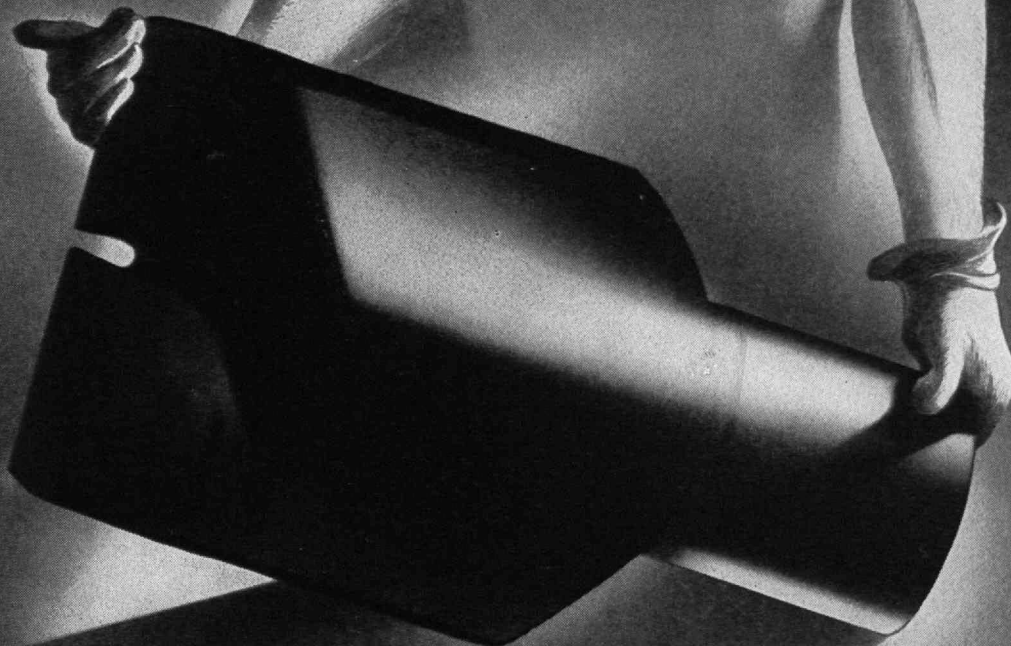
**Khnum.** — How deflocculants, flint, precision measurements, and other items from the paraphernalia of science have been marshaled to assist artists in giving more people the benefit of their art is described in this issue of *The Review* (page 120) by FREDERICK H. NORTON, '18, Associate Professor of Ceramics at Technology, and GEORGE DEMETRIOS, the American sculptor. Professor Norton's researches into matters ceramic, extending over the past fourteen or fifteen years, are well known to many readers of *The Review*. Mr. Demetrios has been working with Professor Norton during the past two years.

**Economizing.** — Black gold becomes a more and more vital asset as war rings the world. Conserving petroleum resources is hence of increased importance. T. V. MOORE, '29, who describes (page 124) conservation in production, is with the production research department of the Humble Oil and Refining Company, Houston, Texas.

**Menu.** — The perennial questions of what to eat, how much of it, and why, become increasingly complicated from day to day. In this issue (page 127) JAMES A. TOBEY, '15, familiar to *Review* readers through his earlier discussions of allied topics, applies the touchstone of common sense to a number of current dietary ideas.

**How Use the Land?** — From the stimulating conference on principles of city replanning held at Technology by the Urban Land Institute last fall, *The Review* presents two provocative analyses of a matter whose bearing on the lives of millions of Americans is intensified yearly. ARTHUR W. BINNS (page 130), who considers the question of replanning our cities from the point of view of the active real estate man, is director of the National Association of Real Estate Boards and chairman of the association's committee on housing and blighted areas. GORDON WHITNALL (page 131) approaches the problem from the point of view of the student of the theory of city planning. A consultant on planning and government to cities and counties, Mr. Whitnall established the planning department of Los Angeles more than twenty years ago.

**WANTED** *Production Engineer:* starting salary \$6,000.00 per year. Should be a graduate of an accredited mechanical engineering school, 30 to 35 years old, to be in charge of all engineering and planning activities for an old, well-established, financially sound company in the Chicago area, making a nationally distributed, high precision product, a substantial percentage of which at the present time is defense work. Applicant should have had mass production experience preferably on precision work; should have a combination of executive and engineering ability. Please address reply to: Box A, *The Technology Review*, M.I.T., Cambridge, Mass.



**Problem: Impact plus wear in thin sections.  
Answer: Chromium-Molybdenum (X4130) steel.**

The aircraft use of Chromium-Molybdenum (X4130) steel has established its effectiveness in parts requiring high strength and toughness in light sections.

The steel is meeting similar requirements in drag-bit blades. They are normalized from 1650 F., oil quenched from 1550 F., and tempered at 900 F.

The allowable high temper, with a retained hard-


ness of 363 B.H.N., provides good wear resistance in addition to the required impact and tensile strength.

Technical details concerning X4130 steel and its applications will be found in our booklet, "Molybdenum in Steel". A copy of this informative technical booklet will gladly be sent to technical students and any others who may be interested.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.  
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**BATH  
IRON WORKS  
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Engineers*

**BATH, MAINE**

## MAIL RETURNS

### *Utilization of '41*

FROM STANLEY BACKER, '41:

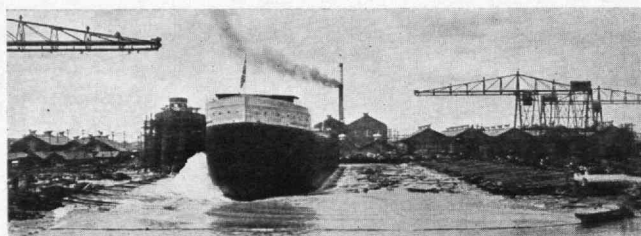
Your readers may be interested in the way in which the Quartermaster Corps is utilizing the services of the various members of last year's graduating class. Definite assignments have been received by one graduate from the Course in Marine Transportation, who is working in the office of the quartermaster general, marine transportation section; by two members of the Course in Food Technology, who are assigned to the subsistence school at the Chicago Q.M.C. food laboratories; by one student from the Course in Building Engineering, who is assigned to the office of the constructing quartermaster at Camp Edwards; and by two graduates from the division of textile technology, who are working in the textile laboratories at Philadelphia and Jeffersonville. Of course, in other branches of the services Technology men have received assignments which correspond in character to their undergraduate work, but these examples appear particularly indicative of the Army's appraisal of the technical school on the Charles.

Philadelphia, Pa.

### *Side Launching*

FROM ALFRED L. FITCH, '84:

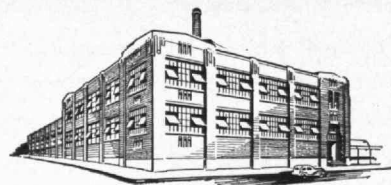
The reference to side launching on page 13 of the November Review suggests that a photograph of a side launching which I made on June 25, 1908, might interest you. This was the first time I had heard of the practice and the only one I ever saw.



The picture shows the ore boat *Daniel B. Meacham* at the Great Lakes Engineering Works near Detroit. The photograph was taken from an excursion boat carrying a party attending a meeting of the American Society of Mechanical Engineers in Detroit. As I remember, the *Meacham* was about six hundred feet long. I have no information as to how the motion was stopped.

North Easton, Mass.

**Speed with  
Economy**



*The Pullman Co.*

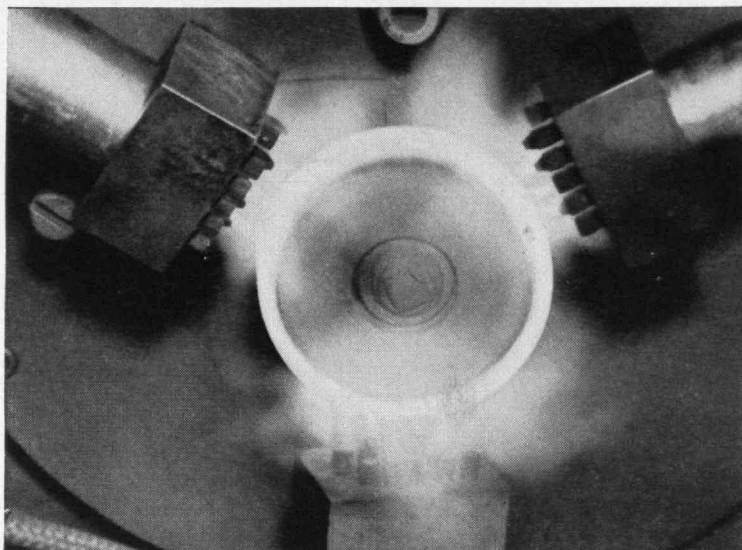
From our data on past industrial projects and our *experience with current conditions*, we can give you a dependable estimate of the cost and completion date of a building before any commitments are made.

**W. J. BARNEY CORPORATION**  
101 PARK AVENUE, NEW YORK  
**INDUSTRIAL CONSTRUCTION**

*Alfred T. Glassett, '20, Vice President*

# How OXY-ACETYLENE FLAME-HARDENING

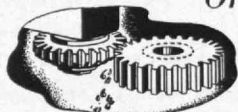
## *helps produce better gears at lower cost*



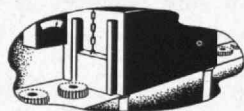
**What Flame-Hardening is**—Oxy-acetylene flame-hardening imparts a hard case to steel and iron parts by means of heating and quenching. Because it can be closely controlled, this method of making wearing parts last longer gets the desired hardness *at only the points where wear occurs*. It does not affect the chemical composition or toughness of the core.

### The Story at a Glance

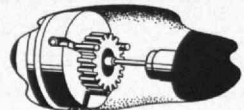
#### Ordinary Method



1. Cutting teeth and *undersized* bore in gear blank.

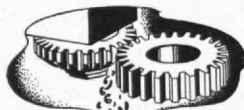


2. Furnace-hardening, with resultant distortion.

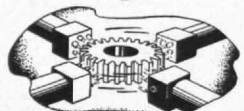


3. Chucking gear by teeth, then grinding out bore.

#### Flame-Hardening Method



1. Gear rough- and finish-machined to final dimensions.



2. Flame-hardening by spinning and quenching.

**RESULTS:** Gear hardened only where wear occurs — harder case — production speeded up — money saved.

**T**HE Fellows Gear Shaper Company manufactures equipment for cutting, finishing, and testing gears. Oxy-acetylene flame-hardening is an important part of the Fellows method because it lowers production costs and helps produce better gears. These gears are flame-hardened by the spinning method. Each gear is rapidly rotated as oxy-acetylene flames are directed upon the teeth as shown at the left—and then is quenched in an oil bath.

#### How Flame-Hardening Saves

Before flame-hardening was adopted, the gears were hardened by furnace heat-treating. To assure gears of accurate dimensions, the finish-machining had to be done *after* hardening. The procedure was to rough-cut, heat-treat, and then finish. To permit final machining, the hardness of the gear could not be too high.

When hardened by the oxy-acetylene method, the gears can be both rough- and finish-machined *before* hardening, without danger of distortion. This reduces machining time and costs. Even more important, the finished gear is a *better* gear, because a considerably harder case can be imparted to it—and at only the points where wear occurs.

#### And Linde Helped Apply It

In the development of this modern machinery for producing good gears in less time and at lower cost, it was Linde's privilege to work with the Fellows organization in applying flame-hardening successfully. If you are interested in using flame-hardening, welding, cutting, or other related processes, remember that you can obtain the gases—the apparatus—and the ability to help you use them—from Linde!

#### The Linde Air Products Company

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street  
New York, N. Y.

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Principal Cities

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LINDE OXYGEN . . . PREST-O-LITE ACETYLENE  
UNION CARBIDE . . . OXWELD APPARATUS

The words "Linde," "Prest-O-Lite," "Union," and "Oxweld" are trade-marks of Units of Union Carbide and Carbon Corporation.



# This we have, this we hold

**IMPORTANT:** *It may happen that here and there a Goodyear dealer this fall will be unable to supply you instantly with your size Goodyear "G-3" All-Weather tread tire. If this should occur, please be patient. Do not blame him if his stock is momentarily low. There is a reason for it. This advertisement attempts to tell you what it is.*

**T**HERE IS THE RIGHT of a man to stand on his own two feet, and with his own hands and talents carve out a place for himself and his family.

There is the right of a woman to look hopefully ahead, to raise up her brood in dignity and self-respect, undictated to save by her own mother-wisdom and conscience.

There is the right of a boy to lead the hale, free life of boys, flying kites when the wind blows, playing cops and robbers when he wants, going to school when he must—and out of it all somehow shaping a future to a good pattern.

There is the right of a small child to its chance for health and love and laughter, to a good start toward who-knows-what fine and useful life in years to come.

Simple things, aren't they, these things that spell America and add up to freedom!

So simple, so wholesome, it seems daft that somewhere bombs scream down to blast them, tanks lunge to crush them, bullets fly to drive from the minds of men the idea that these

are their rights, inalienable.

**B**ut the bombs do fall, the tanks do roll, the bullets do fly—and in such a world our only shield seems to be more bombs of our own with bombers to carry them, more tanks and the cannon to arm them, more bullets and faster guns to fire them.

So it is that from Goodyear factories meant for building things to enlarge life and make it better, now must flow in a swelling tide the things our country needs if we are to hold what we have.

Skills and facilities developed that a peaceful world might have better tires, floor coverings, soles and heels, transmission belts and a thousand like useful things, now focus on the making of barrage balloons, bomber wings and tails, bullet-puncture-sealing inner tubes and fuel tanks, gas masks, rubber tank track treads and a host of other Goodyear-made

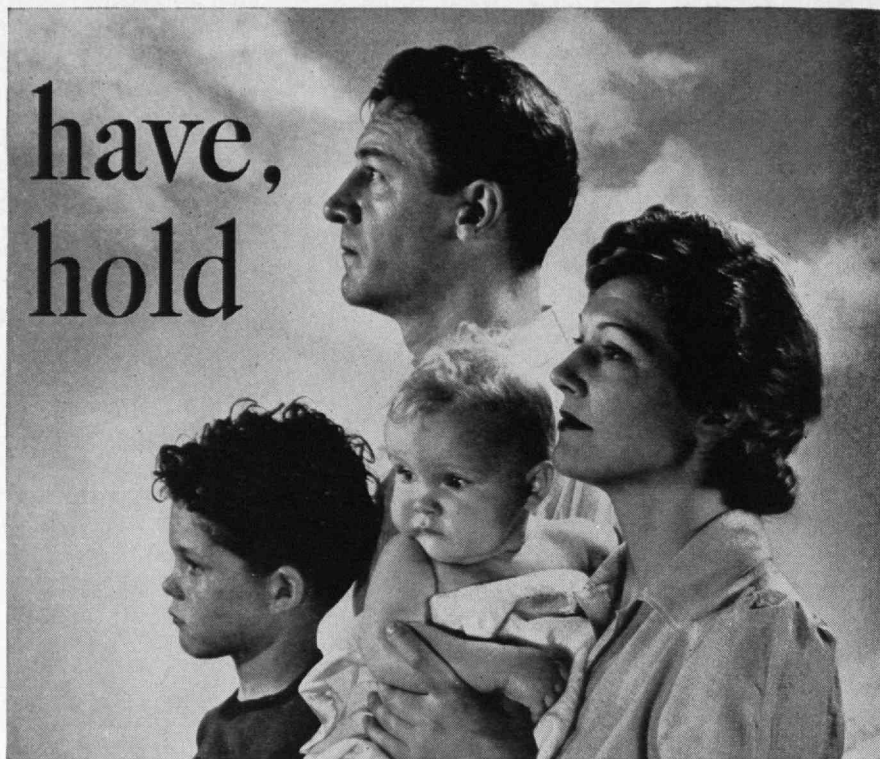
products for national defense.

This is no choice of ours—like yourself, we would far rather spend our days making this a land where life can be richer, liberty enjoyed, where the pursuit of happiness can go steadily on.

But when the decision lies between helping our government prepare for impregnable defense of such things, or running the risk of having them swept away, there is no option and we feel as we know you do.

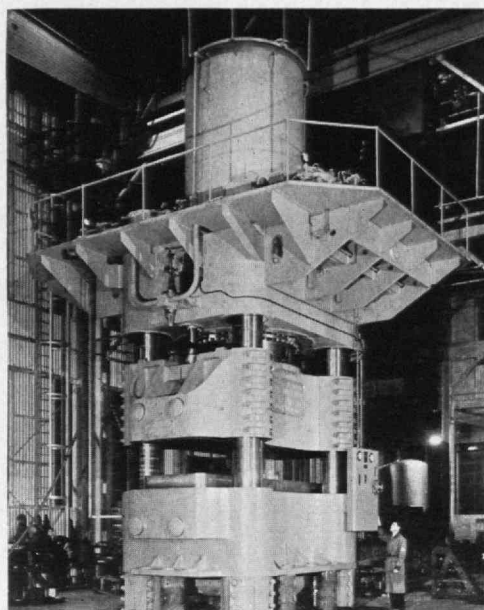
That is why, for the time being, some Goodyear dealer may not have in stock the particular size and kind of Goodyear tire you want—simply because, that which we in America have, we intend to do our part to hold.

Compared with holding it, what else matters?



**MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND**

All-Weather—T.M. The Goodyear Tire & Rubber Company



Hydraulic Press Manufacturing Company

Delivering pressures of 5,000 tons, this titanic machine forms fuselage parts for bombers.

VOLUME 44

NUMBER 3

# THE TECHNOLOGY REVIEW

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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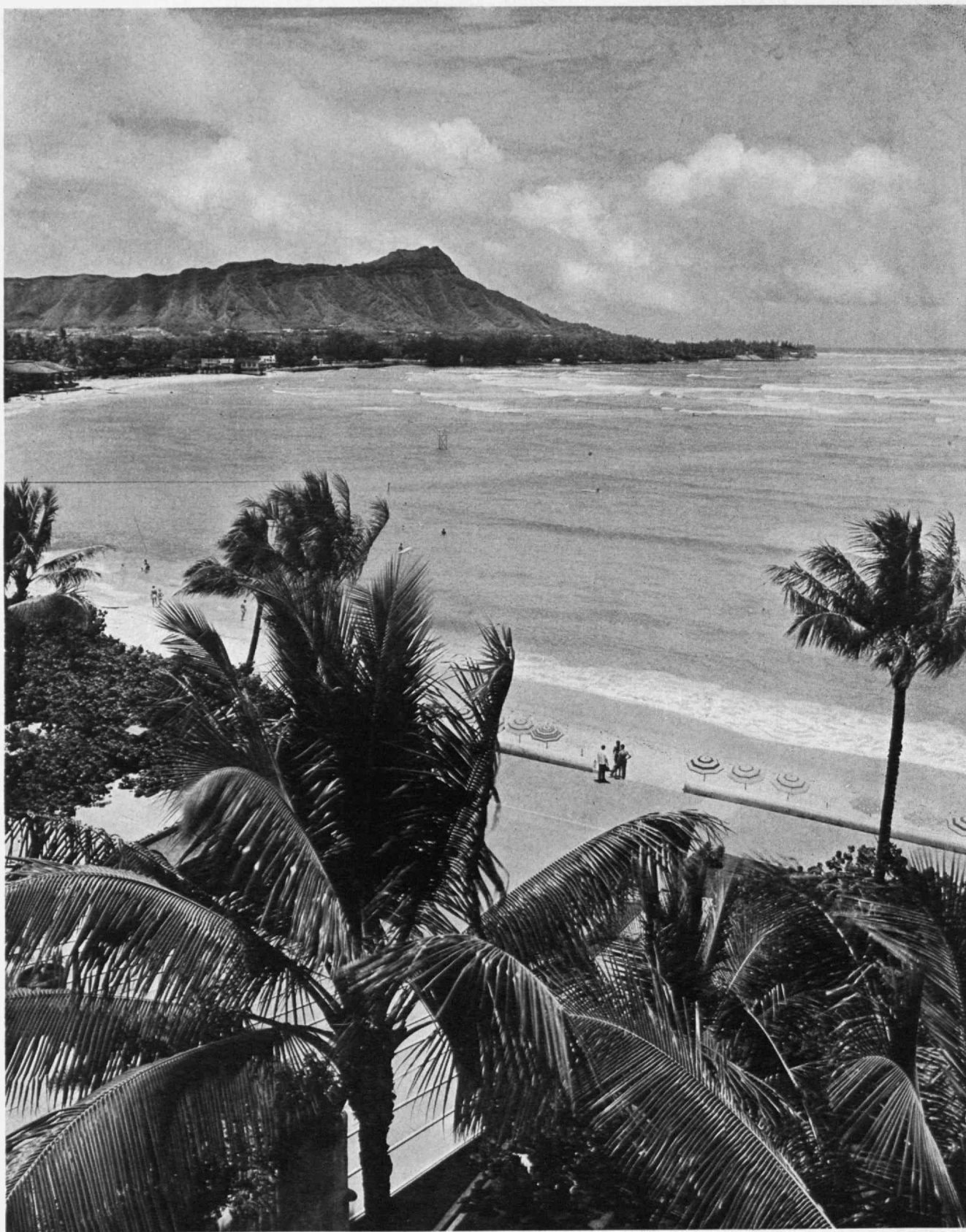
THE COVER — WINTER HILLSIDE  
From a photograph by Paul J. Woolf

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*Pan Pacific Press Photo*

DIAMOND HEAD  
*and the beach of Waikiki before Sunday, December 7, 1941*

# THE TECHNOLOGY REVIEW

Vol. 44, No. 3



January, 1942

## The Trend of Affairs

### *Unwatering Gold*

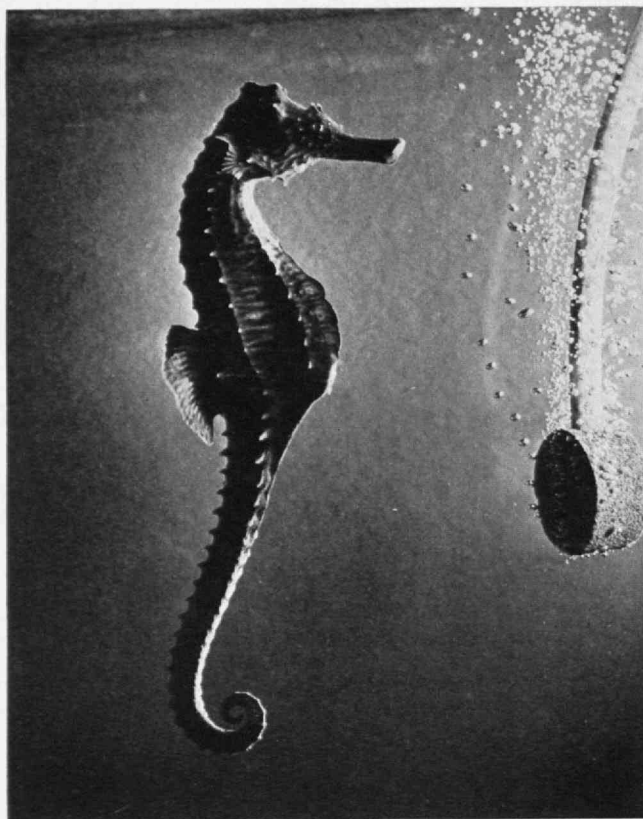
COMPLETION of the Carlton drainage tunnel, which penetrates six miles under the Cripple Creek mining area in Colorado, recalls earlier efforts to lower the water table in the fabulous Colorado hills from which gold and silver have been mined for more than half a century. Early operations in Cripple Creek, which began producing about 1890, indicated that it might be a "dry camp." As shafts went deeper, however, water became a problem, and the El Paso tunnel — first of Cripple Creek's drainage projects — was started in 1903 to unwater the workings of the El Paso mine. This tunnel, driven at an altitude of 8,790 feet for a distance of half a mile, was only temporarily effective, for as mines went deeper, the flow of water increased and pumping costs soon became a serious challenge to profits. Sometimes water outdid the pumps, and shafts had to be abandoned.

The only solution to the problem was another tunnel at a lower level. Hence in the spring of 1907 the Roosevelt tunnel, named for Theodore Roosevelt, was started at a point 770 feet below that of the El Paso. The Roosevelt tunnel was driven to intercept what was then the bottom of the El Paso mine at a point some 14,550 feet from the portal. This famous tunnel was advanced from time to time until, in 1917, it had penetrated a distance of 24,000 feet to lower the water table in an area that included most of the camp's important mines, the economic lives of which were thus extended for some twenty years. Although the need for still another drainage tunnel was discussed for many years, construction of it was not undertaken until the price of gold increased to \$35 an ounce, justifying further exploration at still greater depths in the mines that brought the camp its fame. The problem of draining the Cripple Creek area is best understood by an examination of the geological

structure of the district, which lies in the crater of an extinct volcano. The characteristic rock is breccia, which is composed of fragments of various sizes cemented together with lava. Successive eruptions forced the broken rock and lava upward through the bottom of a great bowl of hard rock known in the Cripple Creek area as Pike's Peak granite. Thus, the porous, mineral-bearing breccia lies in a deep basin of close-grained granite through which very little water can find a way. The various operations to drain the region are analogous to emptying a vessel by tapping its side at various levels. The Carlton tunnel, completed last summer, penetrates Cripple Creek's gigantic granite bowl at an elevation of 6,890 feet, which is 1,900 feet lower than the original El Paso tunnel and considerably below the bottom of the deepest shaft in Cripple Creek.

Two mines have already been drained, the first being the Ajax, which was tapped last February. The extremely difficult task of drawing off water standing seven hundred feet deep in the old Portland shaft was started in September, when a picked crew of miners began seeking a natural watercourse through the rock at a point in the tunnel adjacent to the bottom of the shaft. Such a find might have been used to loose the water pent up above. As no natural answer was discovered, decision was made to drive upward through the rock for a distance of more than a hundred feet to connect with a winze level at the bottom of the Portland workings. This operation, recently described in *Compressed Air Magazine*, from which much of the information in this article was drawn, was perhaps the most dangerous in the history of the Cripple Creek drainage projects. After the shaft had been raised to a point within forty feet of the bottom of the Portland shaft, a crosscut was driven to about twenty feet of the water-filled workings. From the end of the tunnel a two-inch pilot hole was drilled; when the nineteen-foot





Harold E. Edgerton, '27

*A sea horse contemplates bubbles rising from the aerator of his tank.*

drill penetrated the shaft, the tremendous weight of billions of gallons of water drove it back with such velocity that it penetrated the planking of a bulkhead, and water began flowing from the drill hole at a rate of 1,200 gallons a minute.

The next step was to drill twelve closely spaced holes to within slightly more than a foot of the shaft. These were loaded with explosive, and after all equipment and crews had been removed from the Carlton tunnel the blast was fired. An hour and five minutes later a wall of water four feet high surged out of the ten-foot by twelve-foot Carlton bore, proving the success of an extremely delicate engineering operation.

With the deep drainage of the Cripple Creek area assured, a zone ranging from two hundred feet to more than a thousand feet below the level of the present workings can now be explored. The United States Bureau of Mines has estimated that the area now open for deep prospecting contains from \$3,446,000 to more than \$12,000,000 in recoverable ore. This survey, which is considered by Cripple Creek mining engineers to be conservative, does not take into consideration the possible discovery of high-grade ore bodies of enormous value. Cripple Creek, where high-grading has tempted many a miner, has been a camp of rich surprises.

### *Mathematics at Work*

**S**UPPOSE that an electrical engineer, in the course of a project, encounters a problem necessitating the use of ellipsoids. Suppose, further, that not being familiar with ellipsoids he turns to a mathematician for

assistance, and that the mathematician says to him: "Ellipsoids are used a lot in hydrodynamics; maybe this hydrodynamics textbook can supply the answer." Such an incident as this illustrates the usefulness of what is termed "applied mathematics." The mathematician who acted as intermediary in this exchange was able to settle the electrical engineer's troubles by means of an answer from hydrodynamics, because, as a mathematician, he works in a sort of middle ground where many special fields overlap. A number of uses of applied mathematics are already familiar to the readers of *The Review* through descriptions of the work done by members of the Institute's Department of Mathematics in the fields of industrial statistics, quality control, nomograms, and so on. These examples of applied mathematics are very close to the practical, everyday industrial level. The subject, however, includes many other applications which are of much more far-reaching significance, even though they are of less obviously direct use in the day-to-day routine of a factory. The increasingly complex character of many of the products which industry is called upon to manufacture, as, for example, the intricate mechanisms whereby the airplane is able to operate, has tended in recent years to focus attention on the more abstruse aspects of applied mathematics. The critical problems developed by the present defense effort have intensified that attention.

In the modern view, any subject which has a complete logical development is called "mathematics." Thus such fields as mechanics, thermodynamics, theory of elasticity, and electromagnetic theory are regarded as mathematics in so far as each of them is a coherently developed, logical system. Many different subjects possess the same fundamental logical structure. The abstract study of that structure, with no particular instance in mind, is "pure mathematics." If the structure is studied with a particular instance in mind, the study is then "applied mathematics." Thus, the theoretical phases of practically any engineering subject are mathematics as distinguished from the experimental portions of the field. When the amount of mathematical material involved becomes very large in proportion to the experimental work that must be done, the teaching of engineering has to rely more and more heavily on the mathematician. Just as the products of industry have greatly increased in complexity, so in recent decades many engineering disciplines have seen their theoretical content grow much larger relative to their experimental content.

There is hence, in industry, in defense activities, and in teaching, an already great and a rapidly increasing need for men trained in applied mathematics. But only very rarely can a student in his early undergraduate years say with any degree of sureness that he is interested in applied mathematics and wishes to make it his career. Generally, the applied mathematician is a man who commences work in some branch of science or engineering and, after having developed familiarity with it, finds that his interest is aroused and maintained by the mathematics involved rather than by any other aspect of the subject. Just as engineering creates a demand for applied mathematics, so it trains potential applied mathematicians. For this reason, work in this aspect of mathematics should ideally be done in an institution

where many branches of science and engineering are taught and where a department of mathematics works closely in collaboration with departments teaching engineering and the other sciences.

When this situation is realized and when due heed is paid to such a paradox as the fact that, although the whole lift of an airplane can be calculated mathematically to within a very few per cent, no thoroughgoing mathematical analysis has ever been made of the internal-combustion engine as applied to the family automobile — then the beginning of a project for organized and progressive activity in applied mathematics at Technology will be recognized as far reaching and important.

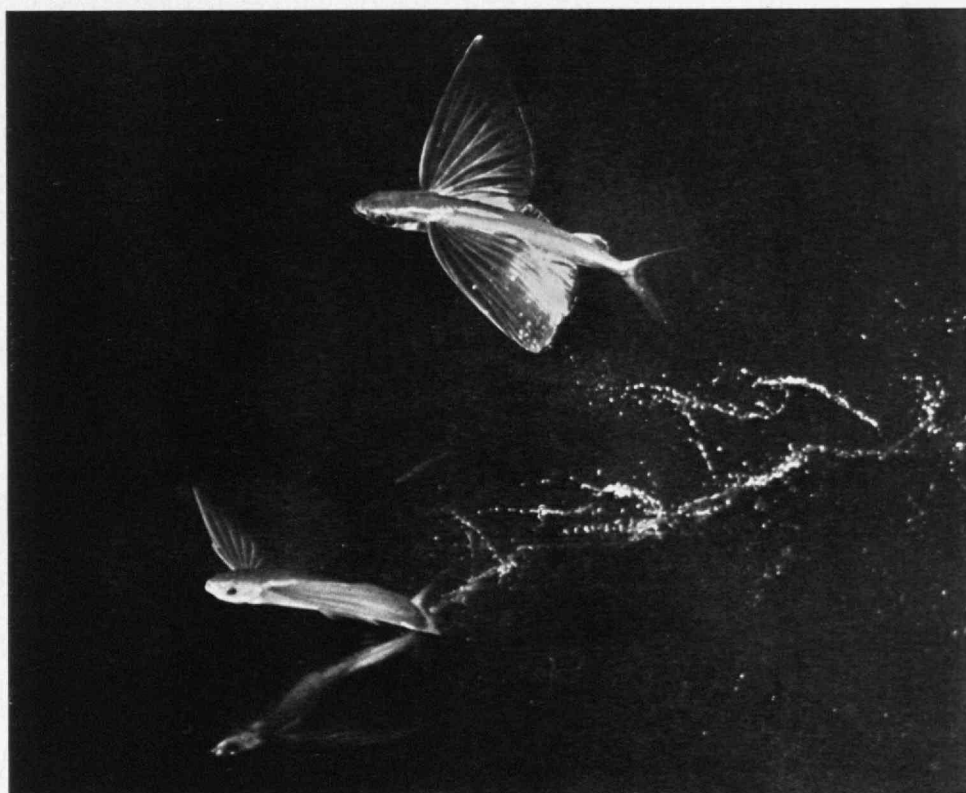
Following the technique of co-operation which is unusually feasible at Technology and which has been for years employed here with pronounced success, a group of mathematicians, physicists, chemists, and engineers are canvassing the whole range of possibilities, studying the chief demands for applied mathematics, analyzing the wealth of ways in which the Institute is equipped to meet those demands, and considering the manner in which those ways can be marshaled with the greatest efficiency and effectiveness. A special grant has been allocated by the Institute Corporation for the first year of operation of the new agency. Present plans call for initiation of organized activity next fall, when fellowships will become available. The committee includes Henry B. Phillips, Head of the Department of Mathematics, Chairman; Norbert Wiener, Professor of Mathematics; Philip M. Morse and Julius A. Stratton, '23, Professors of Physics; James A. Beattie, '17, Professor of Physical Chemistry; C. Richard Soderberg, '20, Professor of Applied Mechanics; Chaim L. Pekeris, '29, research associate in Geology; Ernst A. Guillemin, '24,

Associate Professor of Electrical Communications; and Louis F. Woodruff, '18, Associate Professor of Electric Power Transmission.

Their undertaking at present is to determine whether courses now offered in mathematics suffice to meet the need for development of applied mathematics as viewed by the several engineering and scientific departments; to recommend to those departments where additions, if any, should be made; to establish joint seminars for a common attack, by engineers and mathematicians, on particular problems in applied mathematics arising in the various branches of engineering; and possibly to exercise a joint supervision over the systematic development of work in applied mathematics in the future.

The committee will thus consolidate and expand the very considerable amount of work in applied mathematics already being done at Technology and will establish means whereby properly qualified students may be directly trained to contribute to the future expansion of such work. In applied mathematics, Technology is already making active advance on a broad front ranging from the versatile applications of industrial statistics, developed by George P. Wadsworth, '30, Assistant Professor of Mathematics, and Harold A. Freeman, '31, Assistant Professor of Statistics, already described in *The Review* (May, 1939); through the mathematical attack upon electrical problems involved in the design of spot-welding apparatus, carried on by Prescott D. Crout, '29, Assistant Professor of Mathematics; to work in the theory of elasticity as it specifically applies to aeronautics, being done by Eric Reissner, instructor in Mathematics; and the focusing of highly advanced and recondite statistical techniques upon such practical problems as atomic shifting in the plastic flow of metals, by Professor Wiener. The problems on which these

*High-speed photography by Harold E. Edgerton, '27, here contributes data on the problem of the flight of *Cypselurus californicus* (Cooper). The lower fish is about to take off. His zigzag track marks the "taxi" period and affords an estimate of the power of each tail-thrust in terms of the fish's length. The upper fish is seen in the midst of his soaring flight of some forty feet. How the wing surfaces are expanded in actual flight is well shown. Wing area in dead or preserved specimens appears much less because of shrinkage of the delicate membrane between the supporting ribs. This composite, which is from a group appearing in *Zoologica* with detailed discussion by Charles M. Breder, Jr., director of the New York Aquarium, was made at about 1/10,000 second off the east coast of Catalina Island.*





mathematicians are at work have come from a variety of places — some direct from the job and the factory, others direct from the sales manager's office, others from the laboratories of aerodynamists, and others from government departments. The present project is intended to make it possible for able minds to benefit by association with the work on such problems and, of course, to contribute to the solution of them. To this end, the program of fellowships made possible for one year by the Corporation allocation of funds is expected to be directly productive. In the anticipation that a continuation of the work beyond this first year will be made possible, the joint committee has set out to find the one best way in which to organize.

### *Before Tooth and Claw*

WHILE the use of poisonous gases in that part of the war now being waged in Libya has not been reported, it is interesting to note that chemical warfare was already utilized in near-by Egypt over three thousand years ago. A sagacious statesman of that remote time, a man named Moses, found himself the leader of an underprivileged minority, of a group whose labors, whose very lives, had been drafted for the construction of public works from which the laborers themselves derived no benefit. The works served only for the glory and for the comfort of a dictatorial chief of state who, of course, recognized the advantages to be gained from labor for which he did not have to pay. Though Moses had grown up in the shelter of the Egyptian aristocracy and had been educated in the science of its priesthood, the blood of the oppressed Jews flowed in his veins and he was determined to assist his people to escape from bondage. With this end in view, and with the support and collaboration of Aaron, the high priest, his brother, he approached Pharaoh for the purpose of persuading him that the advantage of Egypt would best be served

if he, Moses, were permitted to lead the Jews out of the country. His first effort was to convince Pharaoh of his superior powers.

Therefore Moses performed miracles. He changed Aaron's staff into a serpent, but the Egyptian sorcerers and magicians were able similarly to change their own — and the serpent of Moses swallowed up the other serpents. The laurels of the first day were with Moses. Moses poisoned the waters, but "the magicians of Egypt did so with their enchantments" and "all the Egyptians digged round about the river for water to drink" — for they knew that impure water could be purified by filtration through the soil. Moses produced frogs, but the magicians also produced them — and Moses removed them all. The wise men of Egypt were not able, as Moses was, to produce lice and fleas. They were themselves infected with the "boils bursting forth with blains" which he produced on man and beast by throwing about corrosive "ashes of the furnace." Shortly after this use of a vesicant agent, prepared by a chemical process involving the action of fire, Pharaoh's patience gave out and Moses was permitted to lead the Israelites away from the place of their servitude.

If an idea is a good one, it is traditional that the Greeks had a word for it, that the Chinese thought it through and tried it out; and not unlikely that Leonardo da Vinci drew a picture of it. So we find that his notebook contains a drawing of an instrument of chemical warfare with notations about it, as follows:

"To throw poison in the form of powder onto galleys.

"Chalk, fine sulphide of arsenic, and powdered verdigris may be thrown among the enemy ships by means of small mangonels. And all who, as they breathe, inhale that powder with their breath will become asphyxiated.

"But take care to have the wind so that it does not blow the powder back upon you, or to cover your nose and mouth with a fine cloth dipped in water so that the



*California Highways and Public Works*

*Fortunately for amateurs of good photography, the highway division of California's able department of public works not only builds impressive bridges but recognizes their beauty. Here is the prize-winning Klamath River Bridge at Orleans . . .*

powder may not enter. It would be well also to hurl baskets covered with paper and filled with this powder from the crow's nest or the deck of the ship."

While it is probably an exaggeration to say that this powder would asphyxiate the enemy, there is no doubt that it would make him extremely uncomfortable, and, inhaled in considerable amount, might cause his death from pneumonia after an elapse of a few days.

There are older and more primitive devices of chemical warfare than any which man has invented. Witness the skunk. Witness also the mosquito and the wasp, and the numerous brotherhood of offensive beetles — the stinkbugs and the blister beetles, who secrete a fluid which raises itching blisters on the human skin. This vesicant agent is similar in action to lewisite and to mustard gas. Back farther yet let us push our inquiry, back through the mud, the clay, the slime, back toward the earth's first prime, back to the Mesozoic age two hundred million years ago. Reptiles then as now were undoubtedly able to secrete a liquid of offensive odor which chilled the blood of their enemies and fulfilled the functions of a chemical weapon. Whoever has tried by means of a stout stick to persuade a large turtle to get out of the roadway and to take a place where he will be safe from automobiles, whoever under these conditions has been met by a hissing, by an attack with a powerful horny beak, and by a musky odor suggestive of remote antiquity, whoever has had the experience has certainly recognized that he is fighting with something which, while not very intelligent, is exceedingly determined and immeasurably old — as old as the hills.

Before ever the hills were, there was the sea. And therein were corals with their nettle cells — touch them not — and medusae, Portuguese men-of-war, *Hydrozoa coelenterata*, all these equipped with devices for stinging their enemies — in Paleozoic times five hundred million years ago. Surely chemical warfare is one of the oldest of methods of fighting.

### To Emulate the Cat

AS, by the paradoxical turns of our age, darkness becomes a weapon in the defense of enlightenment, the development of materials to make blackouts less inconvenient becomes of immediate interest. Reporting to the American Chemical Society on air-raid preparations, Henry E. Millson recently described a number of applications of fluorescent dyes and phosphorescent pigments which promise to ease blackout emergencies. From luminous stockings for ladies to the luminous doorbell button and luminous keyhole that have been the basis of many a joke, the range of uses is considerable.

To illuminate rooms and hallways, wallpaper printed with fluorescent or phosphorescent material offers possibilities. Ordinary paper can be dyed or coated with



California Highways and Public Works

... and here a bridge over land rather than water. This viaduct crowning Donner summit was used in place of a more expensive fill with retaining walls.

highly sensitive materials and produced quickly in large quantities. Screens of cardboard or similar material, coated with luminous pigments that glow when exposed to ultraviolet radiations, can be relied on to give light for operating rooms in hospitals, essential telephone switchboards, and other important places in the event that power connections are disrupted. Luminous buttons and reflectors for pedestrians, as well as luminous articles of clothing, are advocated as insurance against accidents on the highways during blackouts. Equipping automobiles with ultraviolet filters on headlights or with a special ultraviolet lamp connected to the battery and independent of all other lights will be necessary.

The phenomena which may thus be turned to defense use result from the power of certain materials to absorb radiation of a particular wavelength and re-emit it as light of greater wavelength. With fluorescent materials the secondary, or visible, emission ceases as soon as the primary radiation does. With phosphorescent materials, roughly speaking, luminous radiation continues for some time after the exciting radiation has stopped.

Pigments of fluorescent or phosphorescent materials can be used to outline doorways, guide rails, as well as entrances and exits to civilian shelters and homes. The amount of current needed to make such materials glow luminously is so slight that a single battery can be used as power source for a number of ultraviolet bulbs to supply the activating light. Shielding to make the glowing units invisible to bombing planes would of course be necessary. Plastics and resins are well adapted to use in the manufacture of warning buttons for pedestrian wear, since fluorescent and phosphorescent materials can be mixed with the molding compounds.



# Art and Science in Sculpture

## *Terra Cotta Becomes a Medium of Manifold Virtues, Giving the Artist Entire Control of His Work, Promising a Wider Distribution of the Results*

BY FREDERICK H. NORTON AND GEORGE DEMETRIOS

THERE is something particularly compelling to the imagination in the picture of the potter imparting shape, purpose, and usefulness to an inert lump of clay. This compelling fancy reaches superlative force when for the potter we substitute the sculptor and for the menial beaker we substitute the representation of man. Then, as he seems to capture life and expression from a lifeless clump of earth, the sculptor, to those who enjoy fanciful speculation, has often seemed to share in a most minute way the creative attributes of divinity. There is a very good reason why the Egyptians declared that the god Khnum molded the human race upon the potter's wheel out of the black Nile clay and thereafter breathed the breath of life into the nostrils of his creation. The power of this fancy is unquestionably the greater by reason of the profound contrast between the dynamic and vital sculptured expression of a human being and the dull clod whence it was made. Around the fancy also cluster generations of legend and suggestion, strongest of which arises from man's consciousness of his own soon return to that clay.

The materials of sculpture are really of three kinds. Pieces carved from the solid block, though copied point by point from a clay model, employ mediums from the first group — various stones, ivory, wood, and bone. Certain marbles lead this list because of the ease with which they are worked, because of their nicely grained texture and their creamy color, and, perhaps most important of all, because of their translucency, which closely approaches that of the human flesh. Metals cast in a mold made in turn from a model of clay compose the second group of mediums. Of the metals, bronze is by far the most satisfactory for this purpose, since it casts readily, resists corrosion, and may develop interesting surface colors. Other metals, such as lead, tin, and silver, have been used.

The humble clay which is the beginning point for the use of materials from both these classes is itself the basis of mediums of the third class: ceramic materials, either modeled and directly fired, or formed in molds which are taken from a clay original. Ceramic materials thus used cover a wide range of compositions, from crude red terra cotta to the finest white porcelain.

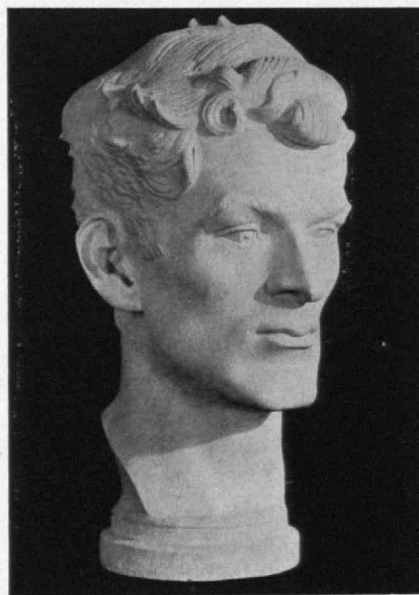
Sculpture has also been produced in transparent materials such as glass and organic plastics. Highly transparent materials, however, are not particularly suitable for portrait sculpture, and the molds necessary for forming them are much more expensive than those for bronze or ceramics. The plastics are gummy, and some sculptors regard them as horrible to manage. With most of

them, moreover, it is impossible to correct, that is, to remove flaws and blemishes which may result from the casting operation. Some very beautiful engraved reliefs have been produced by cutting glass directly with an abrasive. But the hardness of the material offers some restriction to the free development of the sculptural form, so that portrait sculpture would not be possible in such a medium.

Some mediums are more suitable vehicles of expression than others; many times, only the genius of the sculptor in overcoming the handicaps of the material has enabled a great work of art to be produced. The properties that an ideal medium for portrait sculpture should have are not found everywhere. What are they?

In the first place, the medium must have permanence: It must not corrode or decay under normal conditions, it must have sufficient strength to permit handling and shipping, and, lastly, it should be of such a nature that it can be readily cleaned. On the whole, portrait sculpture does not demand the strength of medium required by figures.

Next in importance is the ability of the medium to retain substantially the shape and size of the original model after the final piece is made. In direct carving, the finished piece is a faithful reproduction of the modeled head, but in bronze casting a shrinkage of about 2 per cent occurs, and in ceramics, about 5 to 15 per cent. Unfortunately the shrinkage is not always uniform, so that distortion results.



*This plaster cast of a head by Mr. Demetrios is the second step in a process of reproduction of sculpture developed at the Institute . .*

M.I.T. Photo



Kupstnel

Walter J. Russell

*Cast in the dependable and versatile terra cotta developed at Technology, these three works were executed in Professor Norton's laboratory at the Institute. The seated figure is by Mr. Demetrios; the head of Elizabeth, by Paul Manship; the head of a Finnish boy, by Walker Hancock.*

The medium should have another quality which is more important than would at first be supposed: It must be completely subservient to the sculptor's will, so that the final piece will not show the influence of a struggle to force it into the desired form. A good modeling clay exhibits the desired quality, as do some of the harder mediums which can be readily carved. If we look at the results of sculpture formed from a hard stone, we see at once that the material has forced the sculptor into a style which he would not have considered had the

medium been more pliable. Moreover, we may rightly doubt whether more than ten sculptors in this country today can carve marble from beginning to end; not very many more can carry wood carving through the entire process. In the main, what we see are marble and wood figures done by others from the sculptor's clay model.

The sculptor should be able to control the texture, the color, and perhaps the translucency of the medium. In carving, the texture can be varied, and in some castings the color can be controlled, but only in ceramics do we

*... Here is a partially disassembled mold made from the cast opposite. Parting lines and keys are visible. From this mold, terra-cotta replicas of the head will be made, utilizing a compound of clays perfected at M.I.T.*



M.I.T. Photo





M.I.T. Photo

*Casts from the same mold are not necessarily identical, as these two reproductions of a relief by Mr. Demetrios demonstrate. That at the right is in ordinary terra cotta; that at the left, in the medium developed by Professor Norton. Shrinkage and distortion are clearly evident in the cast of ordinary material.*

approach a complete control of these factors. It is always desirable for the sculptor to control the actual finished surface himself. The remarkable bronzes of the Greeks, Romans, Etruscans, and Chinese demonstrate the point. Their bronze casts were abominable, so that the works had to be chased and filed by the sculptors themselves to that perfection in which we delight today. In modern times, however, the special tools and long training needed with bronze and marble have necessitated turning the completion of the finished work over to an artisan who may have little knowledge of or sympathy with the aims of the artist. Imagine the feeling of a sculptor who, having spent a year on the refinement of the surfaces of a head, visits the bronze foundry to see the progress of the casting and finds a crude youth smoothing the features with a huge file. The medium should definitely be such that the artist himself can give the final surface treatment. Unless the first and the final touch are his, the product will look cold and factory made.

Clearly, none of the mediums used is ideal; all have serious disadvantages of one sort or another. Hence the question rises whether one of the mediums could be altered to eliminate some of the more serious disadvantages and provide thereby a greatly improved sculptural material. To answer this, the most promising material must be selected for a start. Of all the materials, terra cotta seems to be best suited for sculpture because *the end product is of the same nature as the material in which the work is originally modeled*. The following discussion describes work which has been done at Technology over the past ten or fifteen years in developing an improved ceramic body particularly for portrait sculpture.

As the art existed, two types of body were available for sculpture: One was a fine-grained earthenware, possessing excellent properties except for high shrinkage, which amounted to 4 to 7 per cent in drying and 6 to 10 per cent in firing. The other was the commercial terra-cotta body, containing up to 50 per cent of grog (pre-fired clay) and having a drying shrinkage of 3 to 5 per cent and a firing shrinkage of 2 to 5 per cent. The coarse grog made this body unsuitable for portrait sculpture.

After a large number of experiments made to reduce the shrinkage, a terra-cotta body having the following composition was arrived at:

Flint	2,500 grams
Potash feldspar	3,600 "
Light English ball clay	1,800 "
English China clay (Exeter)	2,100 "
Water	8,000 "

Real reason exists for using each of these ingredients. The flint, which is pure ground quartz, serves as a skeleton for the piece and greatly aids in holding a constant volume. The feldspar is a so-called flux and at the firing temperature partially fuses into a glass; it is this glass which acts as a cement to hold the various particles together and give strength and rigidity to the finished piece. Should the firing temperature be carried too high, the glass would become too abundant and would pull the particles together so closely as to cause serious shrinkage and distortion. The ball clay serves to give strength to the dried piece, so that it can be readily handled and worked. This type of clay, which is very fine grained, also assists in giving the casting slip desirable properties. The China clay is more coarse grained and permits rapid casting in the plaster molds.

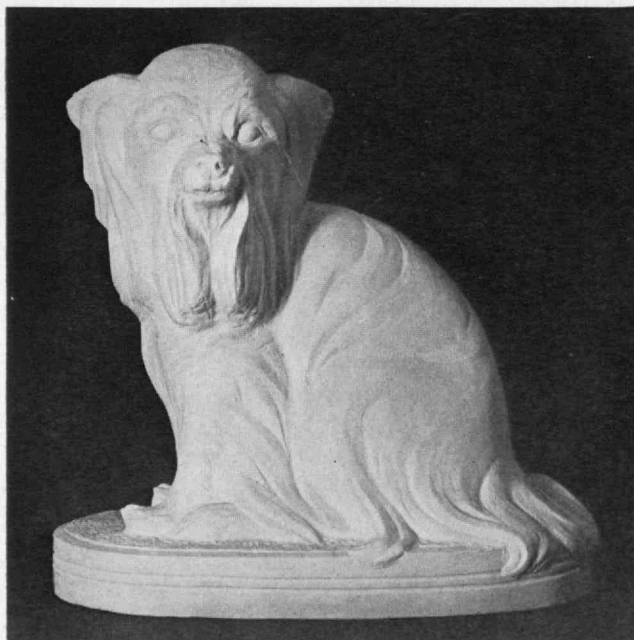
The mixture is ball-milled one and one-half hours, screened through a 100-mesh sieve, and de-watered. The cake is then made into a slip of a specific gravity between 1.86 and 1.91 by the addition of .22 per cent of a half-and-half mixture of sodium carbonate and silicate of soda, all based on dry weight. The viscosity of the slip should be around 2,000 centipoises. This slip, cast in plaster piece-molds in the usual way, shows a drying shrinkage of only 1.0 per cent, while the firing shrinkage at 1,015 degrees centigrade is 0.5 per cent. The total shrinkage, then, is a little less than for bronze and gives no distortion and no observable change in scale. The low shrinkage depends on no revolutionary development but only on a reduction of the clay to the lowest possible amount, the complete deflocculation to reduce the water in the mixture, and the very carefully controlled firing temperature.

The deflocculation of the slip is a very important step in the process, as it permits a clay-water mixture sufficiently fluid to pour readily into the clay molds and yet maintain a low water content, with a resultant thin film between the particles which minimizes the shrinkage in drying. For example, the deflocculated slip has a water content of 22 per cent, whereas an equally fluid mixture without deflocculation would require somewhere around 60 per cent of water and would consequently have three times the drying shrinkage. The deflocculant used here gives an alkaline reaction which neutralizes the negative charge on the clay particles and thus releases a portion of the water hull surrounding them.

The sculptor employing this material can begin and end everything himself. Artistic control of the product is his throughout. He first models the full-sized head in plastic clay or plasteline and then makes a piece mold from which any number of castings in terra cotta can be made. In general it is better to make the original rather simply, leaving the finer details, such as hair, to be finished in the terra cotta. This procedure simplifies the piece mold and allows great freedom in the finishing.

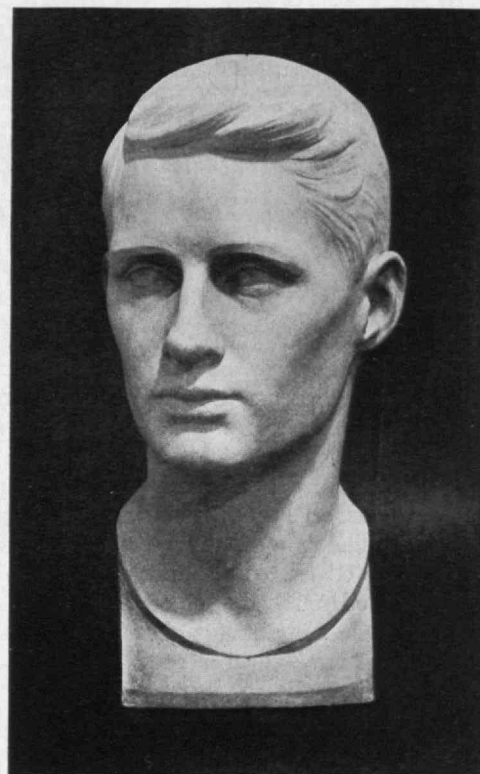
One of the chief advantages of this medium is the great variety of surface treatment which may be given to it. The surface working may start with the newly cast piece while it is in a comparatively soft condition. At that time the clay can be worked with the usual modeling tools, and additional material can easily be applied at any place with a spatula or brush. If desired, a considerable thickness of material can be built on in this way, provided each application partially dries before the next is added. The freedom with which changes can thus be made in the piece enables the sculptor to refine the surface to any degree he wishes.

The piece may then be allowed to dry until it is comparatively stiff and strong but still contains some water. This is the condition that the potter calls "leather



M.I.T. Photo

This portrait of a Pekingese, by Katharine Lane, was executed at Technology in the new terra-cotta medium which faithfully preserves the sculptress' capturing of expression and detail.



*Strength in this head by Professor Norton is well presented by the new medium.*

M.I.T. Photo

hard," a term which aptly describes the consistency. In this condition material can still be added but only in thin layers; the surface can be carved with considerable precision; and minute details, such as the treatment of hair and eyes, can be readily executed. At this stage the surface can, if desired, be burnished with a piece of polished steel or stone.

When the piece is completely dried, still further work can be carried out on it by the use of files and scrapers, since the carving can now be done quite freely, as in extremely soft stone. Much surface modeling can be put in by the use of a stiff brush, so that the forms are nicely tied together, and the surface can be worked over to eliminate the too sharp details of the previous carving. Working on a piece under these conditions gives effects which can be produced in no other material.

After the piece has been fired, it is still possible to work on the surface with stone-working tools, because the material in this condition has about the same hardness as marble. A piece can be finished with great exactness and any remains of parting lines or roughness removed quite easily. The grain is such that a very fine texture can be produced by working in this condition.

When the fired piece has been finished to the desired degree, any soft color may be obtained by spraying the piece with a very thin layer (about .002 inch thick) of the white body slip mixed with a little pigment, and then refiring at the same temperature as the body. By variation of the fineness and moisture content of the application any texture can be secured, from that of a rough pebble to a satin finish. If the freshly sprayed surface is burnished with polished steel, a glossy effect will persist after firing. There is also the possibility of readily producing polychrome sculpture by the use of two slips only slightly different in shade. (Continued on page 139)



# Saving the Oil

## *Conservation of Petroleum Resources of the Nation Benefits from Development of Modern Practices in Production*

BY T. V. MOORE

THE hardships worked by even a merely temporary shortage of petroleum products, such as threatened the eastern states last fall, may well create an interest in the vital question of the adequacy of our petroleum reserves and the measures that are being taken to conserve them. The outlook for the future here is bright. The proved reserve of oil in discovered fields in the United States is about nineteen billion barrels, which, at current rates of consumption, would supply the domestic demand for about fifteen years. In addition, a vast but unknown reserve in undiscovered fields will become available. In recent years, new oil reserves have been discovered at a rate about equal to the rate of production. Obviously, therefore, no apprehension need now be felt over the exhaustion of our petroleum. The creation of this large oil reserve was brought about by intensive effort on the part of the industry and the oil-producing states to find and to conserve oil. If an abundant supply is to be available in the future, the effort cannot be relaxed.

This discussion is confined to the phases of the conservation problem which involve petroleum production. The story of the brilliant achievements in the fields of exploration and refining is omitted, not because their importance is not recognized, but because space cannot conveniently be devoted to discussion of them here.

The need for oil conservation was not widely recognized until the time of the first World War. By that time many customs and practices conducive to waste had developed within the industry. Some of these customs, even though wasteful, were the best practical methods available at the time. They were abandoned as new equipment and techniques were developed. Other inefficient practices came about as a result of the concept formulated by early court decisions on property rights in oil and gas reservoirs. These customs have been far more difficult to supplant. Nevertheless, workable — though by no means perfect — systems for regulating oil production to prevent waste have finally been developed and have been put into effect in several states.

A few geologists, early in the history of the industry, perceived some of the important principles governing the production of petroleum. The function of gas, dissolved in the oil, in expelling oil from the pores of the reservoir rock was recognized. The possibility of efficient displacement of oil by water, which underlies the oil in nearly all fields, was pointed out. Unfortunately, the work of these pioneers was not followed up, and for forty years or more the industry developed in ignorance of the fundamental principles governing the efficient extraction of oil.

Early producers understood the migratory nature of oil and gas, although their ideas were imperfect. Many producers thought that oil flowed in underground streams. Oil and gas were said to be fugacious in their habits. Controversy arose between neighboring producers over the ownership of oil which had supposedly flowed across a subterranean line from one man's property into his neighbor's well, through which it reached the surface and was reduced to possession. Likening oil to *ferae naturae*, the courts decided that title to the oil or gas was vested in him through whose well it was reduced to possession, regardless of the original location of the oil or gas. In the language of a court, "If an adjoining, or even a distant, owner, drills his own land, and taps your gas, so that it comes into his well and under his control, it is no longer yours, but his." This and other similar rulings became known to the industry as the "rule of capture." The courts held that the producer's remedy against drainage lay in the exercise of his privilege of drilling wells wherever he pleased on his own property and of producing his wells as he pleased.

The rule of capture has been blamed for all the evils that have beset the industry; yet it is difficult to conceive of a substitute that would have been workable under the conditions for which the rule was originally laid down. This rule influenced profoundly the technical development in the petroleum industry and made the exploitation of oil reservoirs one of the most highly competitive enterprises known. The oil belonged to him who reduced it to possession; therefore, each producer drilled as many wells as his physical and financial resources would permit and produced his wells as fast as he could, in order that he might acquire as much oil as possible before exhaustion of the field. Under these conditions, it was not surprising that the supply of crude oil was erratic — flowing with the discovery of great flush fields, ebbing rapidly as the wells, early in their lives, required slow and expensive pumping. The alternating periods of abundance and scarcity imposed a strain on the economic structure of the industry. At various times, in a feeble effort to remedy this condition, production was restricted to some extent in a few of the major fields. Although such restriction was sometimes imposed in the interest of conservation, it was usually of too short duration to be effective, and little progress was made in the direction of improved efficiency of production.

Shortly before the first World War, technical talent began to find a place in the producing branch of the industry. Geologists and, later, geophysicists made great advances in the technique of finding oil. Improved

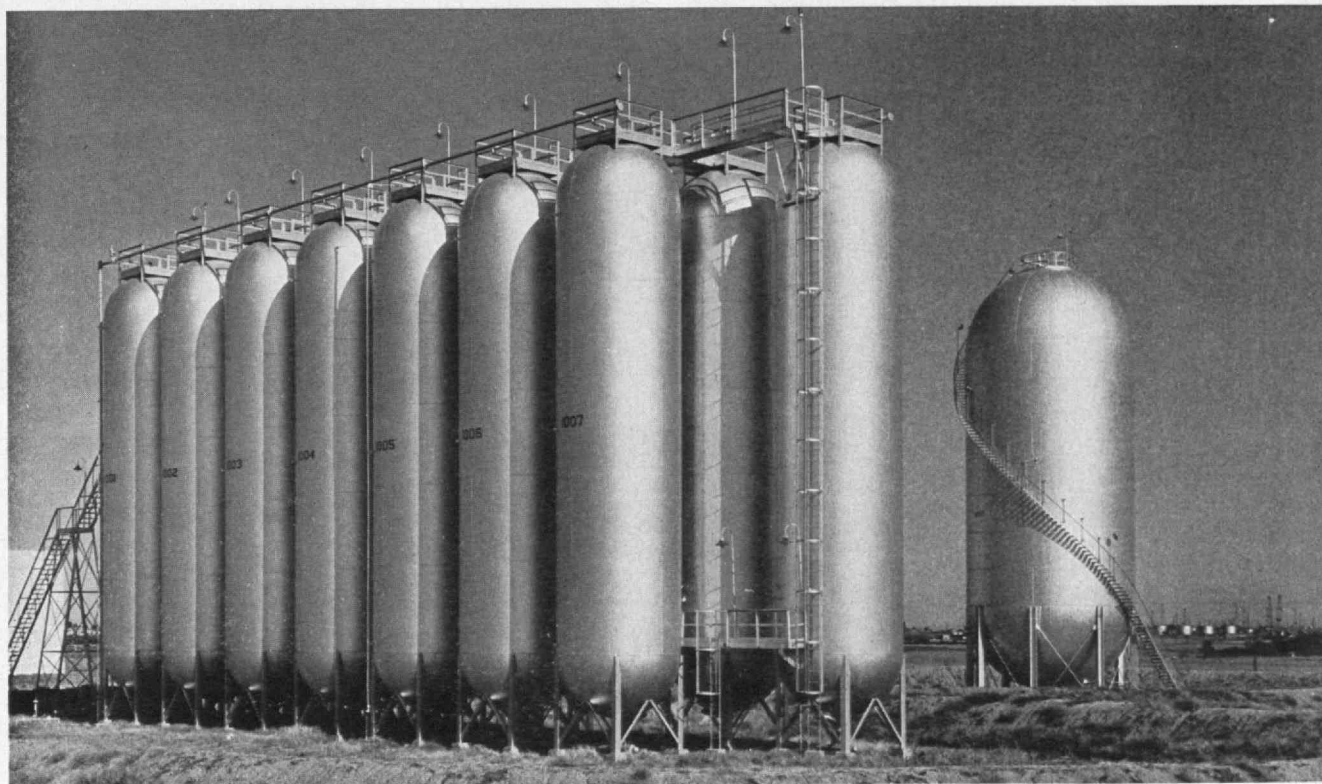
equipment had put deeper and more prolific reservoirs within reach of the drill. Substantial interest developed in methods for increasing oil recovery, and the rate of progress slowly accelerated. One of the milestones in this work was passed in 1927, when the American Petroleum Institute appointed its gas conservation committee. Data from the efforts of this committee formed the basis of a publication by the division of development and production engineering of the A.P.I., in collaboration with the United States Bureau of Mines. This comprehensive report by H. C. Miller, entitled, "Function of Natural Gas in the Production of Oil," was published in 1929.

By 1925 the last period of scarcity of crude-oil supply had passed, and the industry was beginning to feel the pressure of overproduction from recently discovered fields. The development of the fields of the Seminole area of Oklahoma, which followed the discovery of the Seminole City pool in the summer of 1926, flooded the crude-oil market and caused the Corporation Commission of Oklahoma to issue an order restricting production from this group of fields. This action marked the inception of large-scale curtailment and proration.

When the fruitful Yates pool in Pecos County, Texas, was discovered late in 1926, the stage was set for the presentation of a system of production regulation designed to effect conservation. At the time of its discovery, Yates was the largest known oil pool in the world. Production was obtained from porous limestone about 1,400 feet deep, so that drilling, because of the shallow depth, was comparatively rapid and cheap. Many of the wells were extremely prolific, some being able to produce at record rates of about a quarter of a million barrels a day. Early in the life of the field,

production exceeded the capacity of the pipe lines which served it. Facilities for transporting oil out of the field could not be provided as fast as production from new wells was brought in. Accordingly, in October of 1927, the carriers evolved a plan of curtailing their runs from properties so that the runs would equal the capacity of the transportation facilities. The amount of oil run from each well was in proportion to potential producing capacity.

This method of curtailment followed earlier practice and in three months was found to be wasteful and uneconomical. In the first place, the plan encouraged the rapid and untimely drilling of wells, since a large number of wells would give a producer a greater share in the field's pipe-line outlet until such time as his neighbors had drilled a proportionately large number. In the second place, the drilling of so many wells resulted in the concentration of many wells in small areas, and the rapid withdrawal of oil from such small areas was found to bring about waste of gas. Accordingly, the plan was revised to distribute runs of oil from each property in proportion to its proved productive acreage. This plan likewise was unsatisfactory, from the standpoint of what were believed to be the equities involved, since restriction of the most prolific acreage in the field to the same degree of production as the poorest acreage seemed unfair. Hence, modification of the plan once again became necessary in order to combine acreage and potential production in a manner acceptable to the operators of the field. Practical considerations demanded an authoritative administration of the Yates proration plan. Since the Railroad Commission of Texas is charged by statute with the duty of preventing waste of oil and gas, the proration plan at Yates was put into



*At Oklahoma City, gas tanks in an oil field*

*F.S.A. Photo by Lee*



effect by an order of the commission. Although states had previously restricted production to prevent waste, proration in the Yates pool marked the end of an era. The day of the drill-and-produce-as-you-please system was gone.

The Corporation Commission of Oklahoma issued its first state-wide proration order in the fall of 1928; in the fall of 1930, the Railroad Commission of Texas held its first state-wide proration hearing, and many other oil-producing states soon did likewise. The hope, held in many quarters, that proration was only temporary vanished with the discovery of the great East Texas field. The effect of proration was to revolutionize within a few short years the thought, customs, and operations of a major industry. Of course, this change was not easily accomplished, and for years bitter controversy raged among the many oil producers and regulatory commissions over proration and its administration. The Federal and state courts were cluttered with litigation, much of which centered about the method by which the restricted output of oil was to be allocated among the various producers.

One surprising effect of the controversy was the stimulation of technical development in all phases of petroleum production. The state regulatory authorities held periodic hearings to develop information on which to base orders for the regulation of production. Each lawsuit required the preparation of extensive technical testimony. The curtailment of production created a demand that economies be brought about by more efficient operations. The slower pace in drilling and production opened the way to the use of improved techniques applicable only to production at low rates of flow. These factors created for the engineer a permanent and important place in petroleum production.

Improvements in drilling practice, of course, received a large share of the engineers' attention. Rotary drilling became the most widely used method for drilling wells. The process consists essentially in rotating a bit by means of a string of drill pipe, through which a mud slurry is pumped in order to wash the cuttings out of the borehole. Surface equipment on the rotary rig consists of the derrick and hoisting equipment for handling the drill pipe, casing, and other material and equipment; the mud pumps, ditches, pits, swivel, hose, and vibrating screens which compose the mud-circulating system; the prime mover and power plant; and auxiliary equipment, such as racks for pipe storage, lighting plant, light reels for special purposes, and other items.

Improvements in rotary drilling contributed much to the conservation of oil, particularly through: (1) the prevention of "blowouts," which is the term applied to the accidental, uncontrolled production of oil, gas, or water from an uncompleted well; (2) improvement in the technique of well completion; and (3) the development of drilling equipment of greater range, permitting production from deeper fields.

The discovery of many fields in lakes, bays, and even open ocean led to the development of the technique of marine drilling. Often the drilling rig is set on a structure offshore with the power plant and other equipment on barges. The submersible barge, on which a complete rig is mounted and which can be sunk over the drilling

site and refloated upon completion of the well, is widely used for work on inland waters. In swampy areas, such as the Louisiana Gulf Coast, digging canals in order to float a barge to the desired location is frequently more economical than building a road.

Developments in the art of production have kept pace with those in the art of drilling. At the time of the discovery of the Yates pool, ideas concerning the fluid mechanics of oil reservoirs were vague and often erroneous. Mistaken ideas were not the fault of the few engineers who had studied the problem but were due to a lack of data essential to solve a complex problem. The measurement of gas production had received some attention, but not enough. Pressures at the surface of flowing wells were occasionally measured; but only in rare instances had reservoir pressures been measured or had efforts been made to determine the nature of the fluids in the reservoir. The Yates field was controlled by a group of progressive operators, who, realizing the tremendous value of the field and the need for its efficient operation, were receptive to the idea of studying the field with a view to improving the production practices employed. Accordingly, most of the companies assigned engineers to the Yates pool, and an engineering committee was organized. Data were assembled and interpreted on a field-wide basis, and the results of the studies were put into practice. This spirit of co-operation along engineering lines pervaded the producing branch of the industry, and as a result the exchange of information among petroleum producers is now common practice.

Important modern methods the development of which was stimulated by the activity at Yates include the use of tubing in flowing wells in order to provide better control of the gas and water production and to prolong the flowing life of the wells, the use of equipment for running tubing in flowing wells under pressure, and the development of practical instruments which could be run into wells on a small wire line in order to determine subsurface pressures.

About two years after the discovery of Yates, the Sugarland field was discovered on the Texas Gulf Coast. By that time, the important function of gas in the production of oil had been generally recognized, and the operators of Sugarland made an intensive effort to conserve gas. Careful records of gas production and surface pressures were kept on all wells, and those producing excessive quantities of gas were shut-in. The first attempt at a quantitative study of the factors governing the decline in reservoir pressure with production was made at Sugarland. After much study of the reservoir and its behavior, a decision was made to install a pressure-maintenance plant, in which the gas produced would be compressed and returned to the reservoir. For many years, gas injection had been used under low pressure in depleted reservoirs as a successful secondary recovery method, but the Sugarland plant was the first of the many modern pressure-maintenance plants which provide for the conservation of gas in the early life of a field.

In 1930, the East Texas field, which was expected to have the largest ultimate recovery of any oil field in the world, was discovered. Geologic (*Continued on page 140*)

# Doctrine and Diet

## *Developments in Nutritional Science Outrun Education, and Doubt among Consumers Results*

BY JAMES A. TOBEY

**N**UTRITION is the oldest of the arts but the newest of the sciences. The development of nutritional science during the last quarter of a century has been so rapid and so remarkable, in fact, that even scientists are somewhat bewildered. If many scientists are a little dazed by it all, what about the general public? Many people are confused because nutritional science moves faster than education. They are also perplexed by the occasionally conflicting statements from supposed authorities on diet and health. Some of the pronouncements come, of course, from faddists or from persons who are endeavoring to promote special interests. But the time-worn adage that "doctors disagree" applies even to some scientists in this field, although no serious discord is found among the leaders.

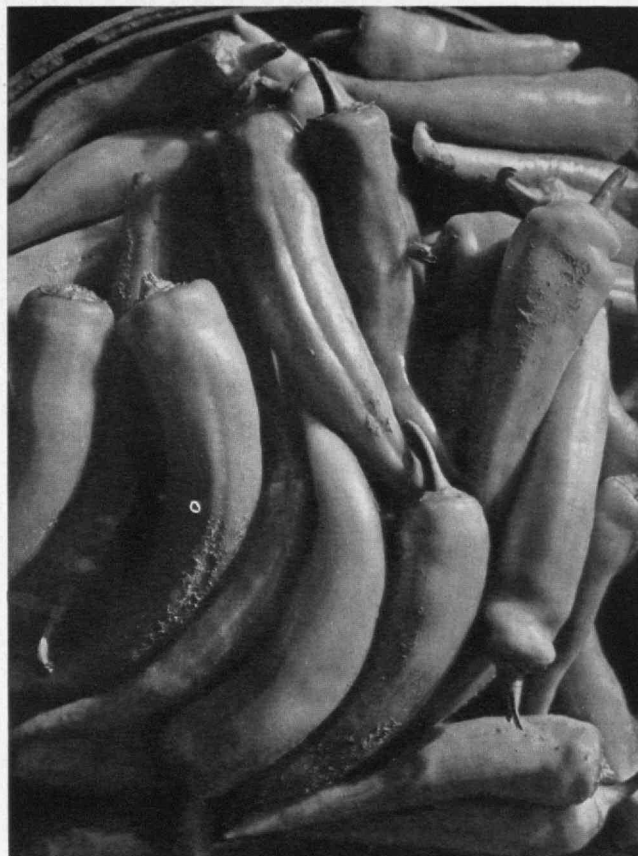
Public attitudes about nutrition are indicated by recent consumer surveys on vitamins, now the most widely publicized of the many nutritional factors. Apparently most persons are familiar with the word "vitamin," but few know anything about the real functions of these essential nutrients or how to get them economically from foods. Too many individuals believe, also, that vitamins are the whole story of nutrition and that if plenty of these miraculous substances are consumed — all will be well. The result is a huge national sale of vitamin pills, tablets, and elixirs, the most expensive and least desirable means of getting these necessary nutriment. Vitamins are only a part, even if an important part, of well-balanced nutrition. One can actually be undernourished on a diet that is comparatively rich in vitamins. If other energy-giving and body-building factors are lacking from the daily fare, all the vitamins in the world will not compensate.

Despite the complexity of the science of nutrition, the rules for right eating are comparatively simple, although it must be admitted that modern civilization has often made difficult the practical application of some of these principles. In order to be well nourished, the normal individual requires daily three general types of foods: energy-bearing foods, body-building foods, and the protective foods. A single food, such as milk or eggs, may of course belong in more than one of these categories, but most foods can be assigned primarily to one group because certain types of nutrients are predominant in them.

The energy-bearing foods are those which best supply the most immediate requisite of the human machine, fuel for its energy needs. As measured in the familiar calories, this energy is derived from all the foods in the diet, but some foods are much better sources of energy than are others. Thus, one slice of bread and butter will yield the same amount of energy as approximately a thousand lettuce leaves or a pound of spinach. Leafy

green vegetables are among the poor sources of energy but are valuable in the diet for other reasons. Our best and most economical energy foods are those rich in carbohydrates, such as bread and cereals or potatoes and other solid vegetables. Fats are likewise excellent sources of energy, giving more than twice as much per ounce as do carbohydrates but usually at a considerably higher cost. Energy-bearing foods which also supply other necessary nutrients are, of course, the most efficient of all. Refined sugar, for instance, is nothing but pure carbohydrate, whereas grains furnish proteins, minerals, and vitamins along with carbohydrates.

If the human mechanism is to operate smoothly and effectively, it must have more than fuel. Life is a process of wear and tear as well as of activity. In order to build, replace, and repair body tissues, the daily diet must furnish proteins, or substances which contain nitrogen (and sometimes sulphur) as well as carbon, hydrogen, and oxygen. At least ten of the twenty or so recognized amino acids — the stuff of which tissues are



F.S.A. Photo by Delano

*Hungarian yellow wax peppers fresh from a Connecticut farm*





Allis-Chalmers Manufacturing Company

Tractor and harvester at work in a field of rye

made — must be obtained by the body in whole or in part from protein foods in the diet. The others can be synthesized by the human machine. Outstanding among the body-building foods are pure milk, cheese, meats, and eggs, all of which obviously are of animal origin. The proteins of grains and vegetables are also good but are, in general, somewhat lower in biological values than are proteins from the Mammalia. An exception is the soybean, an excellent protein food — so good that it has been used extensively by the Nazis as a substitute for meat and as a basis for ersatz victuals fed to German troops.

Finally, we come to the protective foods, so called because they protect the body against deficiencies which result from a lack or a paucity of vitamins and minerals in the daily diet. Minerals such as calcium and phosphorus, iron and copper, sodium chloride, potassium, manganese, sulphur, and iodine, and perhaps others, are fully as significant in human nutrition as are the more widely touted vitamins. Included in the category of protective foods are pasteurized milk, eggs, fruits, green leafy vegetables, yellow and red vegetables, whole-wheat and “enriched” breads, and meats. An adequate diet cannot be constructed unless some or all of these natural foods are regularly in the daily fare. The greater the quantity of protective foods in the diet, the closer is the individual’s approach to optimum nutrition, the kind of sustenance that is conducive to buoyant health.

If, then, the principles of sound nutrition are so simple, why is it that such a large number of Americans are, or are alleged to be, suffering from serious malnutrition? According to some government officials, at least

one-third of our people, or 45,000,000 Americans, are now getting inadequate rations and are suffering from hollow and hidden hunger. Declarations such as these cannot, however, be supported or proved by existing data. True, millions of Americans may not now be receiving diets fully adequate for health, but no one knows exactly how many persons are in that unfortunate group. At the National Nutrition Conference for Defense, held in Washington, D. C., last May, the deputy director of the Selective Service System made the cautious statement that perhaps 15 per cent of approximately a million young men examined for the draft may have been suffering from disabilities connected directly or indirectly with poor nutrition.

Skepticism as to this proclaimed state of our national nutrition was voiced recently by a well-known medical columnist. In a letter published in the *Journal of the American Medical Association* for September 20, this doctor referred to Surgeon General Thomas Parran’s article in *The Review* for June, 1940, and then demonstrated to his own satisfaction that vitamin deficiencies are rare in this country. His data were obtained through letters to numerous hospitals asking how many cases of the avitaminoses had been observed. Commentators on this method of securing facts and opinions about dietary deficiency diseases have suggested that the average medical practitioner seldom recognizes the latent, sub-clinical forms of these conditions and that hospital records do not reveal the vast amount of malnutrition in the underprivileged classes.

Reasons for the poor nutrition which is conceded to exist in a considerable segment of our population are numerous. Some persons suffer from hidden hunger because they cannot afford to buy nourishing foods, others merely because they are ignorant. Methods of cooking certain foods, especially vegetables and meats, may also have a deleterious effect upon vitamins and minerals. Too many of the nutrients go down the sink with the cooking water or are destroyed by the use of soda, by excessive heating, or by other culinary abuse. The processing and refining of foods, made necessary in many instances by modern economic conditions, often have had adverse effects upon nutrition. For instance, in order to produce flour that can be stored and shipped satisfactorily, flour that appeals to an overwhelming public demand, our millers have made fine, white flours from which a considerable portion of the vitamins and minerals have been removed. The bakers have restored some but not all of these nutrients by using milk, yeast, malt, shortening, and other nourishing ingredients in making their white breads. Flour now comprises only about two-thirds of the finished loaves. The sugar refiners have given us pure sugar devoid of vitamins and minerals. Cereal manufacturers, rice purveyors, margarine makers, and other food vendors have given us processed articles that often have been good for little except economical food energy. Recently the margarine manufacturers have seen the light and are adding vitamin A to these economical food fats.

To change the food habits of the people is difficult, if not impossible. Some progress can be made in the course of a generation or two if a skillful program is initiated among our more or less pliable school children, but quick

results generally cannot be attained from mass education. Witness, for example, the fervent attempts to induce people to eat whole-wheat bread in place of white. After fifty or more years of ardent efforts by sincere nutritionists, by schoolteachers, and by faddists and crackpots, less than 2 per cent of the flour produced in this country is whole wheat, and the consumption of whole-wheat bread was lower in 1939 than it was in 1937. Food habits, as affected by educational efforts, change with a speed that resembles the torpid movement of a glacier. To be sure, changes have occurred in the American diet during the past century, but they have been due mainly to the availability, convenience, economy, and attractiveness of certain foods, such as tomato juice, citrus fruits, and fresh and canned vegetables. The consumption of wheat products has declined, whereas the use of refined sugar has shown a tremendous increase. The consumption of milk, our most nearly perfect food, has increased a little, but, on the whole, the consumption of dairy products has been static.

If food habits cannot be altered rapidly and advantageously, the problem of nutrition may nevertheless be solved, at least in part, by changing the foods themselves, as has been done in the development of enriched flour and bread. These are white or near-white products, enriched with vitamins and minerals natural to whole wheat. For practical purposes, these enriched staples are virtually equivalent in nutritive properties to 100 per cent whole wheat. The importance of this action is demonstrated by the fact that bread and other wheat products now supply about one-quarter of the calories in the national diet. If every one of the ten and a half billion loaves of bread produced annually by bakers in this country were enriched in accordance with accepted standards, the people would get at no extra cost a substantial part of the vitamins of the B complex, which are required for the best physical fitness and morale. At the end of October approximately one-third of our commercial white bread was being enriched.

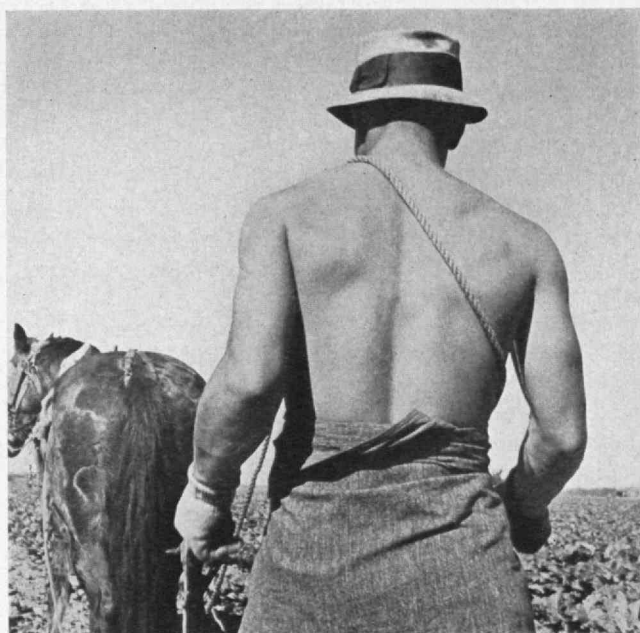
Some of the vitamins of the B complex, which include thiamine (vitamin B<sub>1</sub>), riboflavin (vitamin B<sub>2</sub>), and nicotinic acid (the pellagra-preventive factor), are the nutrients that have been most often lacking in adequate amounts from the average American diet. Surveys of representative cross sections of the populace indicate that iron, calcium, and vitamins C and D are other essential nutrients frequently lacking from many, if not most, diets. Iron and calcium are now available in the new enriched breads, among other foods, while vitamin C is plentiful in fruits and certain vegetables, such as potatoes, cabbage, and green vegetables. Vitamin D is easily obtainable in irradiated and other special milks. For more than ten years, this bone-building food factor has been added to all canned evaporated milk and to a relatively small fraction of our fluid market milks. Despite continuous efforts to publicize the dietary advantages of such milk, less than 10 per cent of our entire supply is now fortified with vitamin D in response to public demand. Perhaps the failure of most of the public to appreciate the product is due to the fact that vitamin D milk is justifiably sold at an increased price.

Striking demonstrations of the value of vitamins in the diet have been provided by numerous controlled

clinical tests. One of the most interesting was an experiment conducted at the Mayo Clinic under the direction of Dr. Russell N. Wilder, who also serves as chairman of the committee on food and nutrition of the National Research Council. Much of the improvement now being accomplished in our national nutrition has resulted from the efforts of this committee.

In order to determine the effects of thiamine, a number of volunteers at the Mayo Clinic were placed on diets adequate in every respect except in this particular vitamin, B<sub>1</sub>. At the beginning of the experiment, the women were contented, able workers. After a few weeks of the attractive but defective diet, the subjects became depressed and quarrelsome, tired easily, and lacked vitality. The next event resulting from the deficiency in thiamine was open rebellion, with daily strikes resembling those which afflict modern industry. Within forty-eight hours after thiamine was restored to the meals of these subjects, the mental difficulties had gone and all was serene. Perhaps an abundance of thiamine in the diet of everyone would solve the problem of industrial unrest.

Interesting and provocative as are demonstrations such as these, they should not be allowed to obscure the fact that proper nutrition depends not only upon an adequate supply of vitamins in the diet but also upon a sufficiency of minerals, body-building proteins, and carbohydrates and fats for energy. In all, at least thirty-six different elements are required to make up a well-balanced diet. Included are ten amino acids from proteins; at least a dozen well-recognized vitamins and probably more; as many minerals; a source of the simple sugar — glucose — derived chiefly from carbohydrates but also from fat and protein; linoleic acid from fat; and water. These various substances must fit together like a mosaic to sustain life and promote health. Their interrelationships are tremendously complicated. The human machine is, in fact, the most intricate of mechanisms. Although remarkably stable, it is influenced by innumerable beneficial and adverse (*Concluded on page 142*)



F.S.A. Photo by Lange

Spring plowing in a California cauliflower field



# To Stop Urban Blight

## *A Partnership between Private and Public Effort Is Proposed; City Values May Thus Be Preserved*

BY ARTHUR W. BINNS

LAND uses in our cities, as well as city systems of traffic circulation, must be replanned on a realistic basis, discounting optimism as to future city growth and giving primary consideration to creating livable home neighborhoods — free from traffic dangers, smoke, noise, and other city nuisances — in which a normal and wholesome family life can exist. Deteriorated districts in our cities now comprise approximately one fourth of the urban areas. The present assessed value of property in such areas probably runs into forty billions of dollars. Several million property owners, as well as the cities themselves, have a common and vital stake in stopping the spread of such blight and in replanning and rebuilding blighted areas. Unless positive steps are taken soon, our cities can look forward to a generation of gradual disintegration — physical, political, and social — with constantly declining real estate values and increasingly unfavorable neighborhood and family environments.

The causes of this creeping blight are numerous, but they rest primarily in technological changes which have increased the feasible areas of urbanization manifold near every city. Existing plans for the development of our cities have been subjected to the control of units of government too numerous and too small to cope with the great tide of change. Property owners, mortgage interests, and public officials concerned with the physical aspects of cities could not foresee the impact of the new technology on urban planning. The urban land pattern of today, therefore, is wholly unsuitable for the complexities of modern city life. The problem of providing adequate and wholesome housing is only a part of the larger problem of replanning and rebuilding our cities. Any piecemeal attack on the housing question which ignores the basic need for replanning can have only partial success and may aggravate the disease of blight, which must first be cured. The crux of the problem, therefore, lies in urban land planning.

Some five years ago the National Association of Real Estate Boards committee on housing and blighted areas began its labors. Since then it has earnestly sought to understand the causes and solutions of the great problems which confront us. Early in the study the fact became apparent that vast forces, far greater than any individual administration or any local circumstances, were at work. These great forces stem back to the industrial revolution, the appearance of the automobile, the decentralization movement, and the machine age generally, which have had the effect of transferring the burden of society, to a large extent, from individual to collective shoulders. It became apparent that talk of rugged

individualism and the ability of any one individual to cure great areas of our blighted cities was sheerest nonsense. It also became apparent that the troubles from which we suffer were not produced by this administration or by the preceding administration but were rather the outgrowth of these great industrial forces. In other words, these basic pressures created the New Deal — the New Deal did not create the pressures.

Private initiative, the right to own property, and the freedom of enterprise seemed to be the great principles which had built America and made it the greatest nation upon the earth. The committee felt that at all costs these principles must be preserved. Yet it realized that it was confronting a situation in which eleven millions were unemployed; in which one hundred billions of dollars were idle; in which starvation existed in the midst of plenty; in which our cities were rotting under our heels, and a large proportion of our population was living in hovels far below the American standard of living. The fact became clear that, much as the American way of life might be revered and cherished, this American way of life could not survive unless some solution were found which would (Continued on page 144)



## *How Shall We Re*

# Zoning by Design

## *Partial Answers to Urban Problems Are Not Enough; Basic Use of the Land Must Determine the Plan*

BY GORDON WHITNALL

NATION-WIDE studies of American cities of all sizes reveal an almost universal disintegration of improvements, uses, and values. These trends are especially evident in commercial centers, but residential areas also reveal extensive blight. In 1930 the average building height in the area comprising the central business district of Los Angeles, for instance, was four and one-half stories. By 1940, in spite of a population increase of over a quarter of a million people, the average building height in the identical area reduced to three and one-half stories. That is the physical picture. On the financial side, the assessed valuation for taxation purposes within the same area has reduced by exactly 60 per cent.

Most prominent among the many probable factors that are producing changes in our cities is the automobile. Prior to the prevalent use of the motorcar, populations were anything but mobile except to the degree that they were moved in the mass by common-carrier transportation. The automobile has released the individual to the point where he is no longer tied to the ground. To such an extent has this phenomenon happened that the mass of population has become so

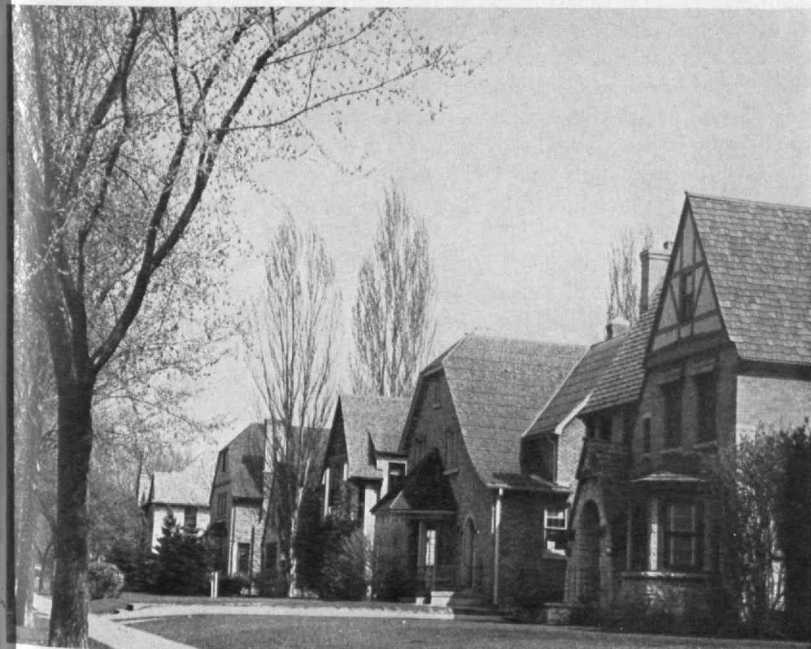
saturated with wheels that it definitely assumes the character of a fluid. The result is that a city as a whole and its commercial centers in particular function very much in keeping with the dictates of mechanical law. So definitely is this true that we find the law of diminishing returns exerting its influence.

Among the earlier efforts to grapple with the situation was the creation of a more adequate network of major streets in order to facilitate access to the central district by automobile. But the downward trend of daytime population, valuations, and business volume continued. It was then realized that value of commercial property is but a convenient determination of earning power of property. Earning power, in turn, is but a measure of buying power, and buying power became measured chiefly in terms of automobiles rather than individual human units. The capacity of the central business district was therefore discovered to be increasingly determined by its ability to absorb motor vehicles. Out of this fact has come a new urban problem of terminal facilities for automobile travel, the common term of which is "the parking problem."

Various solutions have been tried. Commercial parking lots have sprung up. The practice of providing subsidized free parking for patrons has become quite prevalent. More recently, however, business institutions have, with varying degrees of success, been experimenting with providing parking accommodations for their patrons. In many instances relocations have been necessitated, which in turn have contributed both to disintegration and to decentralization.

In short, we have discovered that the mechanism of a city has not been designed as a unit but has merely accumulated to a point where it is completely devoid of real functional utility. Now that populations have become fluid, cities can no longer rely upon the artificial stimulus of old forms of transportation, and, as a consequence, they are disintegrating. The conclusion is that in the past we have developed an excess load upon the land which can no longer be maintained. What we call disintegration and decentralization seem to be merely the natural processes of adjustment. Our problem is to discover a justifiable load on the land and then design and build to that.

One other element enters prominently into the picture: In a community all buildings group themselves readily into three classifications — residential, commercial, and industrial. The design of buildings for each of these three groups of uses differs radically, a fact which has always been accepted as a matter of course. But fully as important as the buildings themselves is the



*plan Our Cities?*





*Constant urban evolution summarized: Rockefeller Medical Center in New York with a bulldozer at work in the foreground*

Bruno Roth

land that composes their site and the additional land set aside to serve them, such as that devoted to streets, railroads, and so on. The manner of land utilization by each of these three basic groups of uses is as radically different as are the needs for different types of structures. Yet the raw materials provided for all forms of land use have for the most part been identical. Inevitably, therefore, this complete lack of land design from a functional standpoint has compromised the interests of all uses. It must now follow as a logical consequence that in the design of new cities and the redesign and reconstruction of old ones, the functional necessities of land and the facilities to serve it must constitute the subject of greatest concern.

Mr. Binns, in his article on a preceding page, has mentioned the fact that whatever program of rehabilitation a community may employ, a prerequisite is the assembling of land on a scale adequate for those redevelopments. He has also advanced most interesting proposals for the establishment of necessary governmental agencies and the determination of certain basic principles as other prerequisites to any successful program of rehabilitation.

From what has already been learned, it becomes increasingly evident that the neighborhood unit is the basic component of any city. Just as the size of individual persons does not grow with the size of a city, and as the size of automobiles does not increase with the demand for them, and as the size of typewriters does not increase with added volume of office output, so it seems that the general size of the neighborhood unit should not be enlarged. In all of these examples, increased size in the aggregate unit merely involves a greater number of constituent parts. The neighborhood unit presents itself logically as the cell, the multiplication of which in varying degrees determines the size of the metropolis. The real problem, therefore, becomes twofold: first, designing an adequate neighborhood unit in the sense of providing all of the facilities essential to make it a complete unit and, second, correlating the relationship of all such units into a well-balanced and functionally sound city. Just as with the individual

residence, the neighborhood unit should consist of all of the requirements necessary for the convenience, comfort, and welfare of the residents within it.

The chaos that is so universally typical of American cities today springs largely from the lack of understanding of these simple truths and also from the anarchical contributions to city growth that have been totally oblivious of the fact that an urban community cannot be economically, functionally, or socially sound so long as it consists of a formless plasmic mass. As the inevitable problems from past practices reveal themselves, we have sought vainly for salves and poultices that would cure the deformities and paralysis, but to no avail. One of these salves we have called "zoning."

The birthplace of zoning is California. Unintentionally the practice of employing the police power for purposes of controlling the types of property uses dates back to the Eighties when, to control the location of Chinese, the city of Modesto legislated control of laundries. The intentional use of the same means dates only from 1909, in the city of Los Angeles. The United States Supreme Court validated such use of the police power. In 1916 New York City produced the first comprehensive zoning ordinance.

The mechanics of early zoning consisted mainly of the simple process of actual observation of the use of existent lands within a city and the assembling of such information in map form, generally by the use of a color legend. This process served to reveal in miniature the land-use pattern of a city as of the time the study was made. The term "pattern" is significant because usually a study of the distribution or concentration of comparable uses indicated a rather definite pattern that proved to be related intimately to various features, such as streetcar lines, elevateds, subways, steam railroads, water fronts, and hills and other physiographic features, not customarily included in the earlier studies. These kinds of information soon developed a related picture of "cause and effect" out of which, in turn, came an understanding of trends and probabilities. These were then used in tentative groupings under the use classifications that were to be incorporated in a zoning ordinance.

Then related matters were studied. Prominent among them were studies of traffic flow in all of its forms. Population trends, population densities, and a rather large array of similar considerations — all were dissected and analyzed. They do not seem to have had much beneficial results so far as zoning itself is concerned, but they have served to explain in some degree why zoning has been as ineffectual as it has.

Very significant among the studies made as the technique of zoning became more involved was the inquiry into the mathematical ratios of group uses as revealed by actual conditions at the time of the survey. It proved to be both interesting and important to discover how much property, by actual successful use, could be supported as "commercial" by a given population or by areas devoted to residential uses. The same thing was done for residential and industrial uses, but here the result proved to be wholly unstable because of the radically varying characteristics of different cities.

When zoning was established in a city, its subsequent use became involved in an ever denser web of red tape and political manipulation. The very foundation of constitutional law and its limitations upon the use of the police power were not so much flaunted as they were simply ignored. Of course, out of these practices have also come court interpretations concerning the validity and the limitations of zoning. But the whole subject is still in its formulative stage, largely because of the different constitutional and statute backgrounds existing in the various states of the Union.

The theory behind past zoning really wasn't a theory at all but was a practice born of necessity. Like many American legislative approaches, it represented an afterthought and was invented as a hoped-for means of stemming a tide of chaos. The whole structure of zoning was predicated upon the belief that the uses of property could be so controlled as completely to eliminate incompatibility and the resulting damage to

property use and property value. Like much regulatory practice, zoning undertook to impose arbitrary restrictions against doing the natural thing, and in that it has proved to be inherently deficient. Not generally recognized at the time of the birth of zoning was the fact that the ills which it purported to cure were inseparably wrapped up in the planless, nonfunctional design of cities. Many proclaimed zoning to be the savior of cities. But time has demonstrated that the results are on a par with laws against thievery in a community where people are starving. The real value of zoning appears to be the lessons its partially vain use has taught us. Among these gains has been the growing understanding that out of the functional design of cities will come the principal control over the manner in which the land making a city will be used.

One thing seems certain: The discouraging results of zoning to date have prompted more study, whence have come realizations that already are proving helpful through encouraging further study. We know, for instance, that in the average mature American city fully 90 per cent of all property is at the mercy of chance as far as the stability of use and value is concerned, except in the degree to which the property is offered protection through government. The reason for this situation is that, even though all properties may at one time have been privately restricted, such restrictions have expired. Private restrictions, regardless of their mere legal strength, are helpless in the face of surrounding difficulties created by chaotic use of properties not subject to such restrictions. Furthermore, the only true basis for protection is known to be the relationship of an individual development to the community of which it is to be a permanent part. Certain inescapable laws which are not man made, such as the law of supply and demand, the law of gravity, and the law of diminishing returns, are factors that cannot be ignored. An illustration is the Los Angeles (*Continued on page 150*)



*A section of the Old Harbor Village development of the Boston Housing Authority*



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# THE INSTITUTE GAZETTE

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PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

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## *Girded for War*

AMERICA'S entry into the war found the Institute well prepared to apply its resources effectively to an objective which, Dr. Compton told members of the staff and the students at a general convocation on December 19, must be "a war effort fought on the highest level of technical skill which our scientists and engineers can devise."

The Institute has long been ready for the change of pace necessary for a full-out war effort. For over a year many of its laboratories have been working on important national defense research in many fields, and more than two hundred members of the staff have been co-operating with the government in research or as consultants. More immediately, the Faculty voted, on December 17, to shorten the last term for the Class of 1942 by approximately four weeks in order to permit seniors to be graduated on April 27. Acceleration of instruction for the senior class is to be accomplished by omission of some subjects and inclusion of more class exercises a week in others.

In his convocation address setting forth Technology's course in the war emergency, Dr. Compton said in part: "The compelling urge of every American citizen and every American institution is to bring this war speedily to a successful conclusion. We are determined to eradicate aggression and aggressors from the world, and to establish a society in which free people can achieve their aspirations without fear or compulsion. Today the problem specifically before us of the Massachusetts Institute of Technology is how we as individuals and as an institution can most effectively help our country to make these noble purposes come true. And, most urgently, what can we best do to help win the war?"

"In a time like this we must take care lest our emotions overpower our intelligence. Never before has there been a war in which brain power has been so much more potent than brute force or undisciplined mob enthusiasm. For warfare today is highly mechanized: A few tanks can rout the very bravest regiment of infantry; a squadron of bombing airplanes can destroy a fortress; a submarine can sink a mighty battleship.

"To win this war we need many brave soldiers, sailors, aviators, but they will be uselessly sacrificed unless we arm them with more numerous and more powerful tanks and with devices to fight tanks; unless we build fighter planes so numerous and equipped with such ingenious instruments and powerful armament that enemy bombers will be helpless before them; unless we devise means for detecting and disposing of enemy submarines before they are able to perform their deadly mission; unless we invent, build, and use a host of technical devices more potent than those which our enemy can bring to bear against us; and unless we keep continuously ahead of him in this terrible race for technical superiority. If our war effort is to be successful and is not to be needlessly

wasteful of American lives, the war must be fought on the highest level of technical skill which our scientists and engineers can devise, which our industry and labor can implement through production, and which our armed forces can use through sound training and progressive leadership. Furthermore, we must be farsighted enough to plan for a war whose decision may not be reached in two or even three years."

## *Dedication*

THE new Chemical Warfare Service Development Laboratory which occupies a new building at the Institute was formally opened on December 11 at a ceremony attended by high-ranking army officers, a group of well-known scientists, and administrative officials of the Institute. Captain Jacquard H. Rothschild, C.W.S., who is in charge of the laboratory, presided and introduced President Compton and Brigadier General Ray L. Avery, Commanding General of Edgewood Arsenal in Maryland, who represented the chief of the Chemical Warfare Service, Major General William N. Porter. In presenting the new facilities to the Chemical Warfare Service, Dr. Compton said that establishment here of the Chemical Warfare Service Development Laboratory can be most appropriately described in chemical terms.

"Last year," he said, "the Institute developed plans for a building to house its growing Department of Chemical Engineering. As these plans were rounded out, the Chemical Warfare Service was expanding its program and realizing the need for more intensive research and development as a result of the expansion of our military service in response to the needs of national defense. Here in Cambridge, then, we were preparing to start immediate construction on the chemical engineering laboratory while, in Washington, the Chemical Warfare Service was developing a need for such a laboratory. At this point, fortunately, appeared on the scene a catalytic agent whose understanding of the problems of the Chemical Warfare Service and the situation at the Institute enabled him to bring the two groups together and to start a rapid productive reaction which resulted in this laboratory here. In the hope that he doesn't object to being called a catalytic agent, I will tell you now that this person was Colonel Bradley Dewey, '09."

The basis upon which the new building was constructed, Dr. Compton said, provided that the Chemical Warfare Service should have the use of the facilities on a contractual basis and, more important, should have available to it the consulting services of the staff of the Department of Chemical Engineering and other groups at the Institute. This arrangement, Dr. Compton explained, is to continue on a year-to-year basis until the Army no longer needs the facilities, after which time the building will revert to the Institute. It will thereafter be occupied by the Department of Chemical Engineering.

Prior to the completion of the building, the Chemical Warfare Service started operations here last June in temporary quarters provided by the Chemical Engineering Department. Captain Rothschild was appointed director of the laboratory, and a group of officers and civilian research workers were gradually selected by him for the staff of the laboratory.

"The building," Dr. Compton said, "is designed primarily to serve as a chemical engineering laboratory and to permit this type of research to be carried on in the most efficient manner possible. Consequently, the building departs from the more generalized structural scheme of the older Institute buildings in our major Institute group. At the same time, it forms an integral and connected part of a well-developed plan for the future expansion of our plant. In this official opening of the Chemical Warfare Service Development Laboratory, I pledge the full co-operation of the Institute and the collaboration of our able staff in the Department of Chemical Engineering in making the program of the laboratory effective. It has been a pleasure for us to work with Major General Porter, Brigadier General Avery, Lieutenant Colonel Maurice E. Barker, '29, chief of the technical service, Chemical Warfare Service, and Captain Rothschild in getting the project under way. We now look forward to a period of productive effort in behalf of our country's military program."

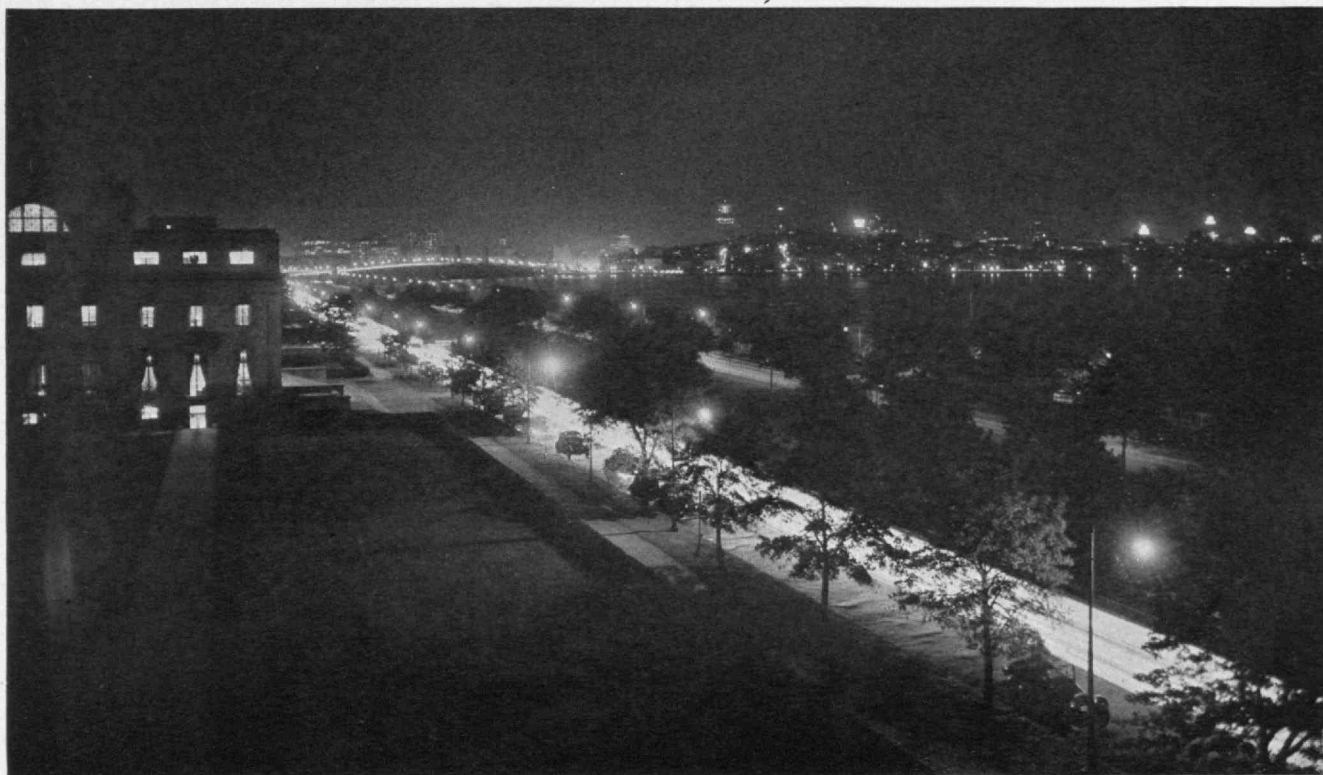
### *With the Council*

**I**NCREASES in the number of contributors, the total amount contributed, and the average contribution made to Technology's Alumni Fund were reported to the

Alumni Council at its November meeting, the 223d, by Henry B. Kane, '24, Director of the Fund, the report being read by Ralph T. Jope, '28, Treasurer of the Association. On November 24, the Fund showed gains of 435 contributors over those of a year ago, from 6,562 to 6,997, or 6.6 per cent; of \$11,442.71 in total contributions, from \$55,646.65 to \$67,089.36, or 20.5 per cent; and of \$1.12 in the average contribution, from an average of \$8.48 to one of \$9.60, or 13.2 per cent. By the twenty-fourth of November, 859, or 12.3 per cent of the contributors were new, compared to 1,096, or 16.7 per cent the year before.

Plans for alumni meetings were reported by the chairmen concerned. Raymond H. Blanchard, '17, chairman of Alumni Day 1942, briefly discussed the program projected for June 8. Chairman of subcommittees were elected as follows: Class Day, John D. Mitsch, '20; ladies' events, Mrs. Leicester F. Hamilton; luncheon, Bernard E. Proctor, '23; publicity and promotion, Ralph T. Jope, '28; registration, Donald P. Severance, '38; ways and means, Horace S. Ford, Staff; Alumni Day stein designer, Henry B. Kane, '24. Larcom Randall, '21, chairman of the committee on assemblies, reported that his committee had plans well started for the midwinter meeting of Boston Alumni in Walker Memorial on Thursday evening, February 26.

Further discussion of enlarged activity for the Alumni Council followed these reports. Alf K. Berle, '27, as chairman, Francis A. Barrett, '24, and Arthur F. Peaslee, '14, were elected as the nucleus of a committee to start a survey of the present and potential activities of the Council and to formulate plans for enlarging them. Francis O. Schmitt, Professor of Biology, who came to



*From Paul J. Woolf, whose work with photography by night is widely known, comes this view of the Boston sky line, which should stir reminiscences in many Review readers.*





*Cormorant fanciers are a rather select group, whose number includes Alfred V. de Forest, '11, Professor of Mechanical Engineering at the Institute. This and the opposite photograph from his portfolio illustrate your true cormorant fancier's reasons for fancying cormorants. Above is demonstrated the cormorant's common sense in selecting a pleasant location for his domicile . . .*

the Institute this year to take charge of the Course in Biophysics and Biological Engineering, then was presented as the speaker of the evening. Explaining the conception of biological engineering, describing the effect of electronic devices in speeding its development in recent years, and sketching some of the particularly engrossing problems under study, Professor Schmitt gave a most informative and compelling talk.

### *Visiting Committee Reports*

THE reports, such as those which follow, made by the Corporation Visiting Committees afford an interesting insight into Technology's educational philosophy:

#### STUDENT ACTIVITY \*

THIS is the first report of the Committee authorized by the Corporation at its meeting on March 13, 1940, and appointed the following October. The Committee felt that its first duty was to get as broad a background as possible and therefore conferred with Dr. Compton, H. E. Lobdell, '17, Dean of Students, James R. Killian, Jr., '26, Executive Assistant to the President, as well as with members of the Faculty, staff, and undergraduate body.

\* The members of this Committee for 1940-1941 were Marshall B. Dalton, '15, Chairman, Egbert C. Hadley, '14, and A. Lawrence Lowell.

All of these presented their views in detail, and several submitted comprehensive memoranda covering their opinions and suggestions. Without minimizing the problems and suggestions with respect to other phases of student life, the Committee were impressed with the fact that a most pressing need lies in the problem of student housing and more particularly in questions of better opportunities and facilities for the social and cultural development which means so much to the student not only as a part of his Institute life but also as a part of the necessary preparation for his life and work after graduation.

Four classes of students at Technology present four distinct problems: (1) the graduate students, whose housing and other facilities appear to be quite satisfactory; (2) undergraduate fraternities, constituting about one-fourth of the undergraduate student body, which appear to be working well and to be giving reasonable opportunity for social development to their members; (3) the dormitory group, constituting about one-fourth of the undergraduate student body, which appears to warrant a great deal of attention; and (4) the so-called commuters' group, including something more than one thousand students living either at home or in rooming houses, who present a very difficult problem, the treatment of which depends to some extent on that of the dormitory group.

The existing dormitories, with the possible exception of Senior House, in the opinion of the Committee, leave much to be desired as to layout and arrangement. The most important objections to the present setup are noise and lack of privacy. These objections could be overcome to a considerable extent by rearrangement of the dormitories by stairways rather than corridors. This change would also eliminate the barracklike appearance. In some cases structural changes to accomplish the purpose suggested could be made without great expense, and such changes should be made. Undoubtedly a need exists for additions to the dormitories. They should include first of all a library, and rooms where men could talk, play games, and have music.

One of the greatest handicaps is the lack of occasions when students may get together in a social and intellectual way. Student activities involve a large number of meetings for the discussion of business, but those meetings do not have the cultivating effect of conversation among young men in an intellectual atmosphere. Under present conditions the occasion on which conversation may take place with the least loss of time useful for other purposes is at meals; but as a practical matter conversational meals have been prevented by the fact that the only food available on the campus has been served in cafeteria style.

The Undergraduate Dormitory Committee suggested, and the Dormitory Board concurred, that a simple and inexpensive start toward the opportunity for really social meals could immediately be made by substituting table service for cafeteria at the evening meal in Walker Memorial. This change does not necessarily mean abolishing the use of cafeteria in the building altogether, nor does it mean that breakfast and luncheon should not also be furnished as regular meals to those who want them. Table service should be carried out nicely. It should

involve napkins, perhaps tablecloths and large round tables — all that may be necessary to give dignity to the occasion. Of course, any instructors who want to dine in this way at Walker Memorial should have a right to do so. And overhead in the gallery is a large standard library to which a number of the men may like to go after dinner.

In reports to the Corporation, Dr. Compton indicated the desirability of eventually adding another unit to our student housing group. The Committee felt that such a unit should preferably be operated on an appropriate self-contained house plan adapted to the needs of Technology and were convinced that students sufficient to fill such a unit are now living off the campus but desire dormitory accommodations. The present emergency makes immediate consideration of an additional dormitory unit inadvisable, but the need for it warrants continued study.

As a further means of promoting cultural development, the Committee endorsed Dr. Compton's suggestion that a program for convocations of students be undertaken, presenting speakers of note and discussions of a significant and inspirational character. Limitations of space until the proposed gymnasium is completed make impracticable the gathering together of all students except in the Great Court. The Committee were impressed, however, with the value of such meetings and felt that they should be inaugurated to whatever extent may be feasible.

Specifically, the Committee submitted the following recommendations:

(1) That studies already under way for physical changes in undergraduate dormitory layout and arrangement and also for an additional dormitory unit on the house plan be continued to the point where definite recommendations may be made for action if, as, and when funds may be available.

(2) That the Corporation authorize the necessary changes to carry out the suggestions of the Undergraduate Dormitory Committee and the Dormitory Board for table service at Walker Memorial. [This recommendation has been put into effect.]

(3) That the Corporation authorize the adoption of Dr. Compton's suggestion for convocations to whatever extent such a program may be practicable in view of present space and facilities.

#### DEPARTMENT OF ENGLISH AND HISTORY \*

THE Committee met on Friday, March 14, when President Compton, Robert G. Caldwell, Dean of Humanities, Howard R. Bartlett, Head of the Department, and James R. Killian, Jr., '26, Executive Assistant to the President, joined Committeemen Philip W. Moore, '01, Fred T. Field, and Dixon R. Fox. Several members of the staff attended later for a general discussion of the work of the Department.

The curriculum adopted by the Department some five years ago, with such modifications as have appeared desirable from year to year, is being followed. Emphasis on

\* Members of this Committee for 1940-1941 were Philip W. Moore, '01, Chairman, Frederick W. Garber, '03, Laurence C. Hart, '13, Edward P. Warner, '17, Fred T. Field, Dixon Ryan Fox, and Howard Mumford Jones.



... and here is shown the cormorant's pleasantly gregarious instinct, the full expression of which produces tapestries of dry branches, stick nests, and black birds silhouetted against the summer sky. Thus is concluded the natural-history leitmotiv that seems to have run through *The Review's* pictures this month.

improvement in expression has been increased by further development in public speaking. A series of inter-sectional debates was instituted for the freshmen, thus affording larger audiences for the speakers to face, as recommended by the 1939-1940 Committee. The result has been pleasing.

Two years ago a group of men in the Course in Business and Engineering Administration joined in a public-speaking group. The work has been extended this past year, and the number of verbal reports by each man has been increased. The Department is placing much emphasis upon oral presentation, and with seniors in Electrical Engineering is getting the best results from working in groups of approximately twenty men. The students not only get practice in speaking but also, through carefully selected subject matter, increase their general range of knowledge.

Funds have been granted for the purchase of equipment with which to record speech. The Department will experiment with the recorder as a means of improving oral presentation. The second-year option in drama is a very popular one and serves to stimulate interest in both reading and expression. Stressing the importance of study of the history of science and engineering, the Committee recommended that an instructor particularly able in that field be engaged. [This recommendation has been put in effect.] The Committee commented on the heavy teaching load carried by members of the Depart-



ment, and in this connection it should be noted that budgetary provision has been made for an additional instructor to assist in alleviating the situation.

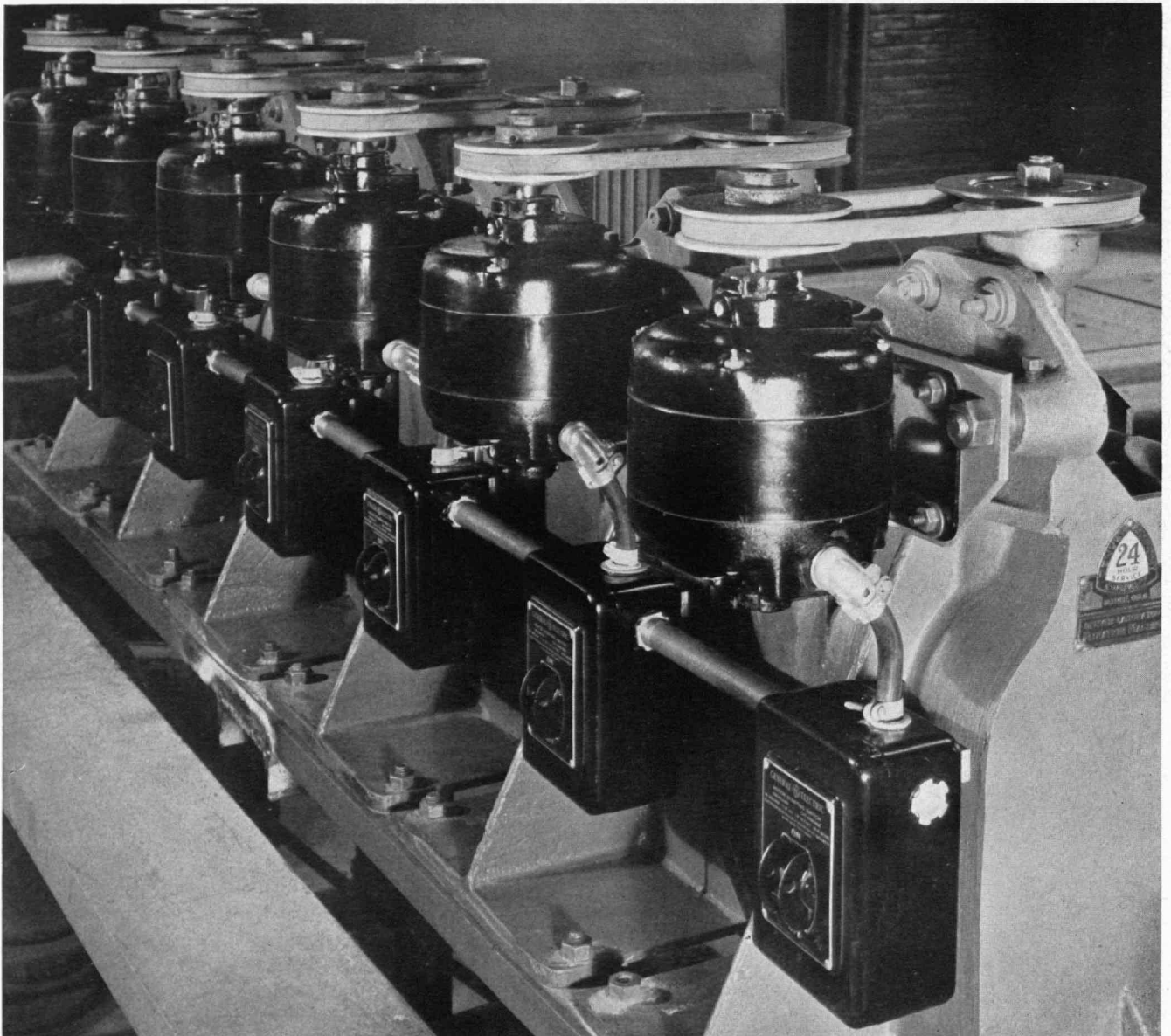
The possibility of devoting some special effort to work with foreign students not well prepared in English was explored. The Committee of 1939-1940 suggested a program of teaching basic English to such a group. Authorities in that subject were consulted, as were the students, and the conclusion was reached that such a program would be of little value. The Department found that, in general, the foreign student is either well grounded in English or very quick to acquire an ability to express himself therein after he has entered the Institute. With a few exceptions inclusion of these students in the regular courses seems to be the best way to improve their facility in English.

The preceding Committee recommended the employment of a roving instructor in English composition who would devote attention to juniors and seniors who

should improve their English. The need for such a person seems well recognized throughout the Institute. Conditions have not as yet allowed such an addition to the staff, but the desirability of a roving instructor should not be overlooked, and the plan should be carried out at the earliest opportunity.

The Department is offering a number of courses that are not usually found in technical schools. A reading seminar was welcomed by some fifteen students, each of whom was urged to follow a program of reading which he had planned with the aid of his instructor. The results were encouraging, and the Committee suggested that this approach to literature be followed further.

The new reading room in Walker Memorial and the fund appropriated for the purchase of duplicate copies of books for that room have made possible the expansion of work in literature and history. After hearing several instructors describe the work done in the various options, the Committee felt that the Department was



M.I.T. Photo

*Photographic rhythm in the newly designed Richards Mineral Dressing Laboratories at the Institute. These motors drive a continuous six-cell laboratory flotation machine for the concentration of ores.*

working in the right direction as far as the organization of subjects and the emphasis on oral and written expression are concerned.

In an effort to overcome the traditional attitude of the entering student and of the secondary schools that English in a technical school is of minor importance, the Committee made two suggestions:

(1) That the Head of the Department, after consultation with the Dean of Humanities and the Director of Admissions, write to the principals of the secondary schools represented in the freshman class, telling them of the good work done by their former students or, when necessary, explaining to them the special difficulties in English which each boy encountered. The purpose of these letters is to call to the attention of the secondary schools the fact that the Institute is keenly interested in the ability of its students to write and speak effectively.

(2) That the aid of Honorary Secretaries and alumni groups be enlisted in the effort to impress upon prospective students the importance of accurate, forceful expression in the life of an engineer or business executive. A word to this effect from an Alumnus will carry far more weight with the incoming student than a similar expression from his instructor in English.

At the request of the Department of Economics and Social Science, a new subject in economic and business history has been planned for candidates for the Ph.D. degree in economics and possibly for the Sloan Fellows. Because of the need for a better understanding of Latin America and the Far East, the Committee hope that the Department will be able also to add to its program new subjects in the history of those regions.

## ART AND SCIENCE IN SCULPTURE

*(Continued from page 123)*

While great color contrasts must be avoided, portrait sculpture can be made far more vital and satisfying by judicious treatment of the hair and eyes to provide that slightly increased contrast which the modeling itself fails to give. A particularly successful example is the head by Walker Hancock shown on page 119. It should be remembered that most, if not all, of the Classic sculpture was originally colored, as we can clearly see from a few remaining pieces in which the color is intact. This color was certainly not intended to be naturalistic but was used simply to bring out contrasts which could not be attained in the original modeling — especially in the treatment of the eyes and hair. During the revival of interest in Classic art in the Nineteenth Century, most of the pieces examined had lost all color, and the development of sculpture from then on was more or less based on the supposition that polychrome sculpture was not in accord with the best traditions. More recent investigations, however, have confirmed the statement that practically all of the ancient pieces had some color treatment on the surface.

The sculptor himself derives a profound satisfaction from the use of terra-cotta slip casting, for the sense of control and of freedom from dependence upon intermediaries is exhilarating. Most stimulating, too, are his experiences with color. Very few colors when applied look as they will later. A dirty yellowish tint turns to red

when fired; a dark gray, into blue; and when red lead is applied in the glazes, everything looks red. Opening the kiln is hence always a thrilling moment. Moreover, when once it has been tested, any color can be reproduced again and again. Work in the mixture of oxides with clays is still in its infancy. Hundreds of combinations of colors can be produced by oxides, and many new varieties of glazes can be and are being developed. These are of course sculptural glazes, differing strongly from those used by the potter. Waxes offer additional possibilities to the sculptor working with terra cotta. Those which soak into the pores of the material give an interesting surface texture which is less dry than the original piece. Waxes may also be used to differentiate among various areas of the surface. They are very helpful in that they improve the cleanability of the piece because of their closing of the surface pores.

This scientific development of a new material for sculpture follows the trend of our present age to bring both art and science into closer contact with each other and with the life of the people as a whole. No research undertaking can ever be called finished, and, of course, more should be done with this medium — to increase the impact strength of the material; to develop more colors, if possible; and to make the body translucent. The work seems worth while, for terra cotta might well become the expression of the country in art. Bronze is prohibitive and, since the first of the month, has ceased to be available to sculptors because of defense needs; marble is twice as costly; and plastics for sculpture are at best unreliable imitations of bronze, marble, granite, and terra cotta. Terra cotta can be produced for very little — a fact which, to the citizen who would appreciate having sculpture of his own, is fully as important as those virtues of terra cotta from the sculptor's point of view with which we have been concerned. Hardly a home in the country does not now possess a piece of sculpture. This statement is not so fantastic if one begins with the five-and-ten-cent sculpture stamped from aluminum, tin, or iron, which children buy; includes next plaster religious sculpture from \$1.00 to \$10 in price; then lists reproductions of Classic or Modern sculpture, mostly in plaster; and ends with the relatively rare originals. Terra cotta can give the beauty of original work to thousands who love beauty but cannot afford the high costs enforced by less fluent mediums. It is not too much to say that a renaissance in American art might be the consequence.

Perhaps more than we realize, the sculptor's production is influenced by the material in which he works. Many historians believe that the prodigious achievements in sculpture in the golden age of Greece were due in a large part to the plentiful supply of fine marble which was found near at hand. Had there been available only stones which were either soft and friable or so hard that they could not readily be worked, the progress of sculpture would certainly have been greatly retarded. It is hoped, then, that this new ceramic material will be generally used by the sculptor of today and that he will be able to produce works of greater merit because of a medium which has been especially designed to give the effect he requires. Naturally, no one should for a moment assume that the availability (*Concluded on page 140*)



## ART AND SCIENCE IN SCULPTURE

(Concluded from page 139)

of this mixture is a short cut; it can be used to advantage only by one skilled in the sculptor's art and willing to work slowly and patiently to master a new technique.

Only the enthusiastic co-operation of many prominent sculptors who have worked with this material in the various stages of its development has permitted the achievement of the final result. We owe a great deal to the many suggestions offered by those artists working in the Ceramics Laboratory at Technology. Walker Hancock, Paul Manship, and Katharine Lane have been particularly helpful.

## SAVING THE OIL

(Continued from page 126)

conditions in East Texas were favorable to a water drive; at the time, oilmen believed that for water to replace oil in an oil reservoir, the water must flow from the outcrop of the producing sand through the entire sand body. The existence of a large continuous sand which outcropped about one hundred and fifty or sixty miles west of the field accordingly drew attention to the possibility of water drive's being an important source of energy in the producing of oil. Computations indicated that, whereas the reservoir pressure was in the neighborhood of 1,600 pounds a square inch, the pressure would have to fall to about 800 pounds a square inch before gas would come out of solution and become available for expelling the oil from the sand. These indications emphasized, of course, the value of the potential water drive in the field.

Preliminary calculations showed that a rapid decline in pressure should occur. To check this point, several producers co-operated in making periodic subsurface pressure surveys of the field, instituting a new practice which has contributed much to the modern technique of conserving oil through efficient production methods. The results of such surveys showed that the pressure was not declining so rapidly as was anticipated, and accordingly many engineers discarded the water-drive theory in favor of the idea that gas, and not water, provided the energy for the production of oil. The answer to the problem hinged upon the pressure at which gas came out of solution. Further study led to the development of a practical subsurface sampler, an instrument for obtaining a sample of oil and its dissolved gas under reservoir conditions, which made possible for the first time the obtaining of data on important physical and thermodynamic properties of oil. The data obtained in East Texas proved the water-drive theory to be correct. Explanation of the unexpected behavior of the pressure lay in the fact that water, in quantities as large as are found associated with oil fields, behaves as an elastic fluid and not as an incompressible liquid. A remarkably accurate method based upon this principle was developed for predicting the variations in reservoir pressure as a function of the water and oil production. This concept led to a revision of the ideas concerning the geologic conditions necessary for water drive.

As data were accumulated on reservoir pressure in other fields which had produced efficiently throughout their lives, it became apparent that water drive was a far more common method of producing than had been supposed. Under the older methods of production, oil was withdrawn at too rapid a rate to permit the water to enter the reservoir and serve the useful function of displacing oil. Discovery of the potentialities of the water drive marked another important step in conservation practice.

Studies of the efficiency of oil recovery often yielded conflicting conclusions, and it was suspected that errors were made in estimating the amount of oil originally present in the various fields studied, since accounting for sufficient oil to fill the pore space of the rock was difficult. In 1936, the development of nonaqueous drilling fluids permitted several typical oil sands to be cored without contamination of the core samples by water. This work proved conclusively that substantial quantities of water were held in the pore spaces of oil-bearing rocks. The fact became apparent, therefore, that while less oil existed in the oil-bearing sands, the efficiency of recovery was greater than had been supposed. Gradually the understanding of the mechanism of the displacement of oil from sands by water or gas developed, until quantitative methods for estimating recovery under various conditions were available, thus permitting an intelligent choice of operating methods.

One of the interesting results of fundamental research on the phase behavior of oil and gas under reservoir conditions was the application of the cycling process to high-pressure fields. Under the pressures encountered in deep reservoirs, some oil will vaporize. Therefore, in many deep fields substantial quantities of oil in the vapor phase are often found associated with gas. This oil will condense upon reduction of pressure, and because such condensation is the reverse of the usual behavior of gas and liquid in lower pressure ranges, the term "retrograde condensation"\* was applied to the phenomenon. When authorities recognized that retrograde condensation would occur in deep gas reservoirs if the pressure were materially lowered, the practice known as "cycling" was adopted. In cycling, gas is produced, stripped of its oil, recompressed, and returned to the reservoir in order to maintain the pressure and prevent the condensation of oil in the sand. Oil produced in this manner is called "condensate" or "distillate," and lately has been produced in important quantities.

(Concluded on page 142)

\* The term "retrograde condensation," originally restricted to a phenomenon observable in the critical region of a binary mixture, is used somewhat loosely in the petroleum industry to describe the universal phenomenon encountered when a compressed gas is in contact with a liquid. In these circumstances, the gas takes up, or "dissolves," more of the substance of the liquid than would be expected as measured by the normal vapor pressure of the liquid. In special cases, the compressed gas may even take up less liquid substance. The behavior of natural gas systems at high pressure and temperature is complex. The description of retrograde condensation in the petroleum engineering sense given above is hence necessarily simplified. More precise description of the behavior of gases and liquids at high pressure may be had from such works as *Volumetric and Phase Behavior of Hydrocarbons* by B. H. Sage and W. N. Lacey (Stanford University Press, 1939); and *Theorie der Verdampfung und Verflüssigung von Gemischen und der Fraktionierten Destillation* by J. P. Kuenen (Leipzig, 1906).

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## SAVING THE OIL

*(Concluded from page 140)*

The administrative agencies of the oil-producing states that have conservation laws have encouraged the adoption of superior production methods. During the first few years of proration, these agencies faced a difficult problem in the enforcement of their orders, but in time this difficulty was eliminated. The legislatures of most producing states passed statutes which make adequate provision for enforcement of the conservation commissions' orders. The Connally Hot Oil Act, which forbids, in interstate commerce, the movement of oil produced in violation of a state's conservation regulation, did much to facilitate effective enforcement of the regulations. Finally, throughout the industry, the gradual recognition of the value of the conservation laws and the necessity for authoritative enforcement of them led to healthy co-operation between producers and the state authorities in conservation work.

The procedure of the Railroad Commission of Texas in administering the conservation laws is typical of that followed by other state authorities. Upon discovery of a new pool, a public hearing is called by the commission and usually is held before a member of the commission's technical staff. At the hearing, the operators offer testimony on the geology and general nature of the new field. On the basis of this testimony, an order is issued prescribing "field rules," which may contain: (1) regulations governing casing to be used, the manner in which it is to be cemented, and provisions for tests to be made to insure that the casing has been set in the proper manner; (2) provisions for the use of blowout preventers and specification of the density of the mud to be used in drilling; (3) requirements for certain equipment, particularly tubing, in the completed well; (4) a regulation governing well spacing, which specifies the size of tracts upon which a single well is to be drilled and limits the distance between adjacent wells; (5) a limit on the gas-oil ratio at which a well can produce without penalty; and (6) a formula by which the production allowed to the field shall be distributed among the wells.

In addition to special hearings of this and other types, the commission holds a state-wide hearing at approximately monthly intervals in order to fix the allowable production for the various fields in the state. For this, estimates by the United States Bureau of Mines are used as an index to the current market demand and to the total amount of oil which the fields of the state should produce. The various purchasers of oil submit to the commission reports which set forth their requirements for various grades of oil during the ensuing month. Correlated with other information available to the commission, these reports serve as a basis for fixing the production of the several grades of oil. The total outlet for a given grade of oil is then distributed among the various fields producing that grade. At the state-wide hearings, requests are often made for increased allowances or for changes in field rules. Such requests must be supported by testimony showing that the suggested changes will not bring about conditions conducive to waste.

The administrative system in force, practical and comparatively simple, has contributed much to the welfare of the industry. Any such system cannot be expected to operate perfectly or to the satisfaction of all concerned. Differences of opinion would probably arise among oil producers as to the specific manner in which the present system of administration of the conservation laws could be improved, but the following problems might receive more attention:

(1) Improvement in certain methods of distributing the field, in order to approach more closely the ideal condition under which each operator would have opportunity to recover an amount of oil equivalent to that which underlies his land and to prevent reasonably avoidable drainage from any property.

(2) More stringent control of drilling, particularly in areas of highly subdivided ownership, such as town-sites, in order to eliminate the drilling of unnecessary wells and at the same time to preserve the equities of all operators and royalty owners concerned. Results could be accomplished by pooling small tracts with adjacent ones, as is provided for in the conservation statutes of several states.

(3) An improved basis for the allocation of oil output among fields, in order to avoid too rapid production in some and too slow production in others, and in order that all fields may share the market for crude oil in a more equitable manner.

(4) A sounder basis for gas-conservation regulations, adapted to the requirements of the individual field.

(5) Regulations to prevent waste or excessive production of water in fields where water is an important source of energy for the production of oil.

(6) The encouragement of field-wide conservation methods, such as repressuring, where such methods are applicable. To this end, the obstacles presented by divided ownership and operation must be overcome.

The recent appointment of the Secretary of the Interior as petroleum co-ordinator brought the Federal Government into the center of the conservation picture. A competent staff of deputy co-ordinators and working committees, which has the full co-operation of the entire industry, has been organized. In the face of a serious emergency, such centralized co-ordination may be necessary. Wisdom in the administration of the co-ordinator's office should contribute materially to the solution of the critical problems which may confront the industry before the present crisis passes.

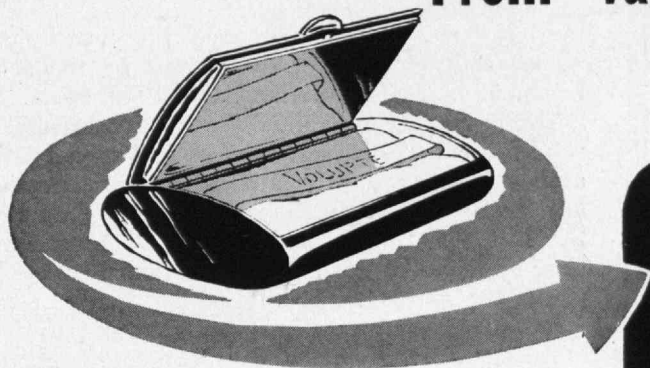
## DOCTRINE AND DIET

*(Concluded from page 129)*

factors in both its external and internal environments. Despite the advances in our knowledge of nutritional and general physiology, a vast, unexplored field still remains. The more humble of the experts readily admit this fact.

Enough is known about human nutrition, however, to assure practically everyone the opportunity for the buoyant health which ensues from proper nourishment. But in order to think straight on the subject, we must keep a sense of balance, giving to all dietary factors their proper place in the immutable scheme of life.

## From "vanities" to primer bodies...



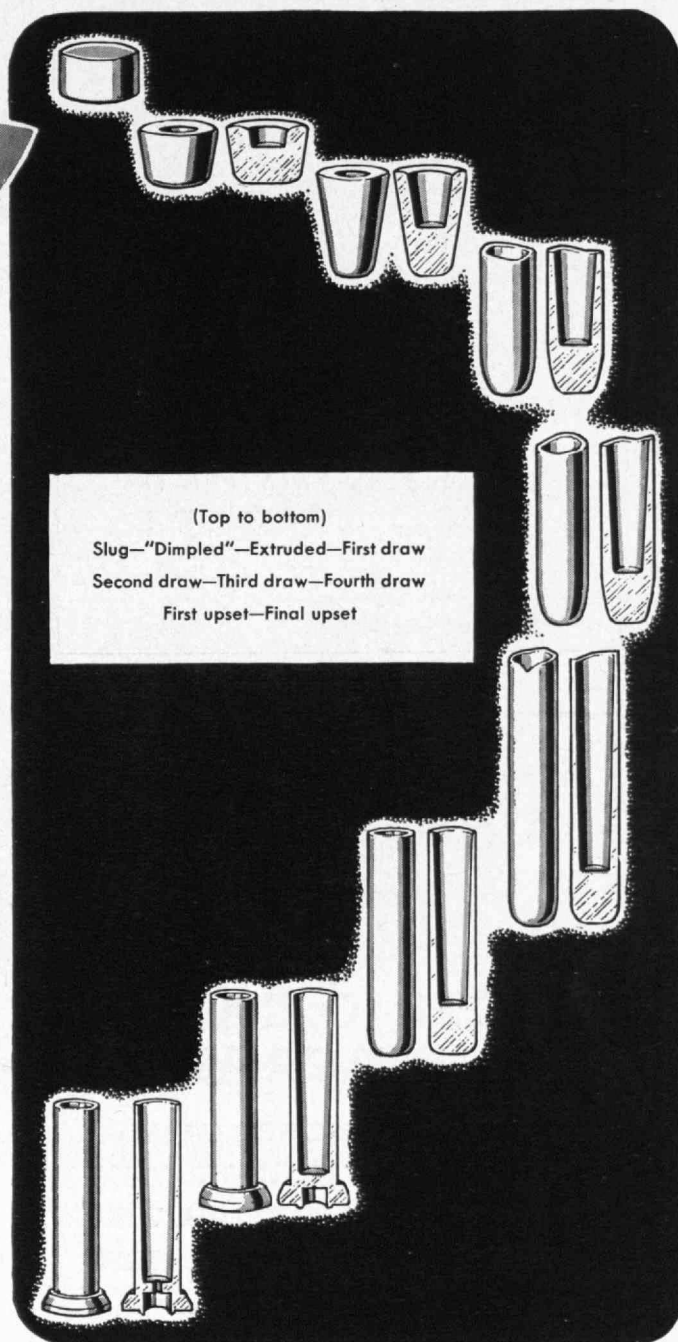
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Everything was new. Appearance had once been vitally important. Now performance took its place. Emphasis on surface finish gave way to emphasis on ductility, uniformity, precision. The brass had to be of a new analysis, responding differently to the various operations. New equipment had to be selected, and new methods worked out.

Here was a situation full of potential "head-aches" for the manufacturer, but also full of opportunity for a Revere Technical Advisor to assist in eliminating them. After calculating a temper for the brass providing the correct balance between ductility and machinability, the customer was provided with a specification which made it easy to specify materials on repeat orders. A correct method was developed for each new operation. Recommendations on sizes of stock were made, to minimize scrap loss.

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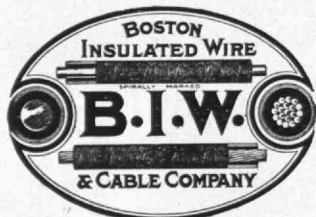
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## TO STOP URBAN BLIGHT

(Continued from page 130)

make it work. Nothing has changed this dismal picture. It is merely clouded for the present by the defense boom. All of the basic maladjustment still exists.

The committee confronted the solution brought forward by countries in Europe which had passed entirely away from free enterprise into total public enterprise — national socialism and the ownership of all property by the state. Great progress has been made in some directions by the totalitarian states. The committee contemplated the spectacle of a worried and harried government — faced by the collapse of private enterprise, ever mounting numbers of unemployed, and ever accumulating sums of idle wealth — resorting to what appeared to be national socialistic trends. Entering into direct ownership of property as it did, becoming landlord to its own citizens, this seemed to be first murder and then suicide!

Very shortly the committee turned from blaming anybody for what had happened and looked forward. It learned to look upon the face of change and be unafraid to meet the challenge. As it approached the problem, the committee was unwilling to contemplate any thought but that our system of free enterprise was adequate.

We need not recount here the decay of the city, the effects of the automobile, decentralization, the appearance of slums intensified by a great period of depression, the lack of equitable distribution of wealth, and all the basic difficulties which have led to the present problem. The three great bars which stand in the way of needed rehabilitation of older areas of American cities are:

(1) *The impossibility of land assembly by private enterprise.* The ten-block, twenty-block, or thirty-block areas needed to create a functionally planned community and to develop the land for its highest and best use in accordance with the master city plan cannot be assembled by private concerns.

(2) *The totally inadequate tax load on real estate near the city.* This obstacle stands squarely across the restoration of blighted areas and the rebuilding and replanning of cities. As a necessary condition to make such redevelopment projects feasible, the city must move toward re-organization of its tax structure to make its real estate taxation sound.

(3) *The curious fact that today no risk capital is available.* Most of our money has drained into institutional holdings. These great pools of (Continued on page 146)

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because it is both tough and dependable  
was used for this shovel

Simplex Wire & Cable Co.  
79 Sidney St., Cambridge, Mass.

## TO STOP URBAN BLIGHT

(Continued from page 144)

idle cash are crying for outlet. But institutional money is not risk money. It is without either legal permission or capacity to undertake actual development and promotions on a risk basis. A generation ago America had great empire builders — men who pushed the railroads across the continent; men who developed large areas of the cities; men who constructed with courage and vision, with risk capital, with daring and initiative. Today, money is in the savings fund societies and the trust companies, and it is utterly impossible for any unaided private enterprise, however strong, to assemble large enough blocks of old city land and blighted city areas at a cost low enough to make redevelopment possible. The plan which has resulted from five years' study by the committee on housing and blighted areas would provide three methods of surmounting these difficulties: (a) a method of land assembly; (b) a safe method by which institutional funds might flow into needed rehabilitation and rebuilding of our cities; (c) an orderly master plan of the city looking to the future.

The first proposal in the plan is that in each urban community a land commission or a land planning commission be established by appropriate state legislative action to plan and to prescribe land uses in the entire metropolitan area of the city. Such a commission should have the power to purchase land and to exercise eminent domain when re-assembly of land in the blighted areas becomes necessary for replanning and rebuilding such areas. The members of the commission should be appointive, be qualified for their work, and be well compensated. The commission would function by producing a master plan for the city and by exercising powers of eminent domain to assemble land areas large enough for redevelopment purposes. After the land has been assembled it will be owned, at least for a period of years, by the city land commission, but it will be leased to a redevelopment company. This company will, under a charter, rebuild the areas and finance the improvements upon the area by the use of institutional money insured by new title in the Federal Housing Administration, giving what now amounts to a yield insurance.

The local land commission must of absolute necessity secure credit from the Federal Government if its work in replanning and, frequently, in re-assembling the land in blighted areas is to become feasible. No power of special or benefit assessment given to the local land commission would be sufficient. The blighted districts at present suffer from excessive land valuations in relation to current use. Imposition of additional assessments or benefit taxes upon such areas would make the entire undertaking impracticable. Moreover, the land commissions cannot depend upon the general credit of our cities. New functions and responsibilities are constantly being added to city governments, with consequent rising governmental costs. At the same time, city land values, which form the primary basis of municipal finance, are declining because of blight and decentralization.

Our Federal Government in recent years has increasingly pre-empted the field of public credit for reasons which lie deep in modern (Continued on page 148)



## "When I'm a Grown-up Lady..."

**"I'll have a beautiful house . . ."**

Indeed you will, Susan. A wonderful house. We don't know exactly what it will be like. But it will be far nicer than today's houses, because *all* houses will be better in ever so many ways. And there will be many things in your house that aren't even invented yet.

**"I'll have a big, shiny automobile . . ."**

Or an airplane. Or even something like a magic carpet—who knows? Our radios and telephones and refrigerators all seemed like magic when we first heard of them.

**"I'll have lots and lots of money . . ."**

Money? Money isn't everything, Susan. But every nickel, every dollar will buy more than it does today. Go on.

**"And—and—and I'll always be happy, like you!"**

☆ ☆ ☆

Happier, we hope, Susan. For right now, in the laboratories, scientists are discovering things to make

life happier, and in the factories engineers are finding ways to make products less expensive and more plentiful in years to come.

Your dreams are coming true because so many men in companies like General Electric believe that the world of tomorrow will be better than the world of today. And they are working to make it so. *General Electric Company, Schenectady, N. Y.*

*American industry has accepted the responsibility of serving America, is accepting the responsibility of helping to defend America, will accept, tomorrow, the responsibility of helping to build a better America and a better world.*

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## TO STOP URBAN BLIGHT

*(Continued from page 146)*

economic trends. Our cities must inevitably turn to the Federal Government for the use of its credit in undertaking the restoration of blighted areas and the task of rebuilding urban communities. The proper planning and rebuilding of our cities involve the welfare of approximately 50 per cent of our population. The adaptation of our cities to changing conditions cannot be paid for wholly by individuals but must be assumed in part by the nation, as has been true with the problems of the farm. Federal credit to local land commissions should take the form of grants or loans at low rates of interest.

The local land commissions should not be authorized to conduct any rebuilding operations on land in blighted areas. All such activity should be done by private redevelopment companies operating under appropriate regulations. These considerations lead, therefore, to another proposal in the plan: that a Federal urban land commission be created in the Federal Government within the framework of the present Federal Loan Agency. This commission should be supplied by Congress with funds with which to make grants and long-term loans at low rates of interest to local land commissions for purposes of replanning cities and assembling land in blighted areas in order that they may be redeveloped. The Federal urban land commission should give grants and loans to the local land commissions only if and when a practicable city plan for the entire metropolitan area is being developed and if the rebuilding of the blighted districts can be assured through private enterprise.

The rebuilding of blighted districts after they have been assembled by the local land commission with the aid of credit from the Federal commission should be carried on exclusively by redevelopment companies chartered under state law or under provisions of the present National Housing Act. These companies should lease land from the local land commission over a long period of years, possibly under a lease-purchase agreement. The plan for redevelopment offered by the companies should be subject to the approval of the local land commission and should suit the broad general city plan and the needs of the community. Sometimes, low-cost housing should be included and should conform to modern requirements with respect to intensity of land use and transportation needs.

Families which cannot pay economic rents in the low-cost privately built houses provided in rebuilt blighted areas ought to receive rent relief from appropriate governmental agencies. The redevelopment companies should be required to have available equity capital amounting to 10 per cent of the cost of the proposed new construction and should be eligible for mortgage insurance under F.H.A. on a basis of 90 per cent of the cost of the improvements. Dividends of these companies might well be limited until such time as the purchase of leased land from the land commission shall have been consummated. Stringent regulations as to sales price and rentals for the properties developed by the redevelopment companies should not be imposed. The problems involved are tangled and *(Concluded on page 150)*



## Not all Protection Wardens wear tin hats!

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HERE in America, busy men with plain felt hats in place of tin ones provide protection day and night for countless homes.

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They're not snuffing out incendiaries on neighboring roofs—but they are helping the families under those roofs to carry on, after death has struck without a warning siren.

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They have chosen New England Mutual as a company because it is old in years but young in spirit. Because it's the first mutual life insurance company chartered in America, with modern policy contracts which are noted for their flexibility.

If you're not near enough to any of these fellow-alumni for a personal conference, look in the telephone directory for the New England Mutual office in your city. You will find carefully trained, experienced men, largely with college backgrounds, who will be glad to talk to you, whether or not you are in the market for insurance.

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Because many of our capable younger fieldmen have gone into the nation's service, our organization has a number of opportunities available in various parts of the country.

If you are between 25 and 35, married, preferably with some sales experience, or if you know some one who fits these specifications and who may not be happy in his present work, why not write to our Director of Agencies, Wm. Eugene Hays (Stanford '26), for further information?

Address your letter to 87 Milk St., Boston, Mass. There will be no obligation involved.



## TO STOP URBAN BLIGHT

(Concluded from page 148)

uncertain, and the companies should be left free to function according to the needs of the community as reflected in the real estate market.

The suggestion is also made that the redevelopment companies not pay a fixed annual rental for the land leased but instead pay 10 per cent of their gross receipts, first to be allocated to interest and second to apply on the agreed purchase price. The redevelopment companies should be free not only to rent but also to sell properties to individuals, so as gradually to restore homes and other properties to individual or small ownerships, which are necessary as a basis of sound community life.

This individual-ownership consideration is the reason for the next proposal: that private redevelopment companies be given the task of rebuilding blighted areas after the land has been assembled by the local land commissions; that such companies be given F.H.A. mortgage insurance in the amount of 90 per cent of the value of the improvements; and that they be given adequate freedom of operation to insure a sound and successful businesslike redevelopment in conformity with a comprehensive city plan and the needs of the community. The companies are not to be regarded as permanent, however, but simply as a necessary intermediate step in the ultimate return of the redeveloped properties to the hands of small private ownerships.

Any process of redevelopment of blighted areas as outlined in the previous three recommendations will fail, in the opinion of the committee, unless local tax systems are rationalized. Real estate is proving to be too narrow a base for financing local government and, as a consequence, local assessments under the ad valorem tax on real estate very often do not reflect current use values. At present entire communities exist in which sales prices of real estate are far below the assessed valuation. Obviously, no enterprise can step into such a situation with any hope of success.

Probably no greater single danger faces the prosperity of this country today than the inequitable taxation of real estate. It is a terrible situation when perhaps 40 per cent of the country's wealth is paying approximately 80 per cent of the tax — is actually being taxed out of existence by a confiscatory approach which is constantly destroying the very body of the thing taxed. Such taxation is utterly unsound and destroys the revenue that it seeks to produce.

The suggestion is not made that the properties created by the redevelopment companies be tax exempt, although land in the blighted areas would be free of taxes as long as it remained in the possession of the local land commission. Some agreement must be worked out with cities, in connection with the rebuilding of blighted districts, which will assure that the tax burden will not defeat the entire enterprise. Such an agreement can be worked out within the present framework of the ad valorem tax system. Modern valuation theory tends more and more to the point of view that all property values are dependent upon productivity and income. Present state laws in most cases permit the local assessors to change

their procedures to a more realistic basis, giving primary emphasis to income or annual rental value. In the past, assessment procedure has been founded largely upon the theory that the continuing increment of land values would offset depreciation. This assumption is no longer valid. With respect to redeveloped areas, therefore, local land commissions should have definite agreements with the assessing authorities concerning the valuation processes to be used in taxing private improvements in the redeveloped areas so that the annual tax burden would be limited to some reasonable percentage, possibly 15 per cent, of the gross income.

Designed to meet this situation is the final proposal: that no tax exemption be granted on improvements created by private redevelopment companies in blighted areas, but that the ad valorem tax system be so applied to such improvements as to reflect current use value, and that the tax represent a percentage of the annual gross income of such improvements.

Here, then, are the four essentials suggested for the replanning and rebuilding of our cities: (1) A local land commission with broad planning powers as to all urban land uses and powers of land assembly in blighted areas. (2) A Federal urban land commission empowered to extend grants and credits to the local land commissions. (3) Private redevelopment companies to undertake the rebuilding process in blighted areas, with provision that such improvements be restored through sale to individual or small ownerships. (4) A ceiling on local taxation based on a valuation related to income and utility.

This program takes into account all the fundamental phases that are essential and would, the committee believes, have reasonable chance of success. Such a program would put to work many dollars of private mortgage money and equity capital for every dollar of public credit employed. A program of this kind would make possible an activity in the rebuilding of our cities which would involve ultimately eighty or ninety billions of dollars in work and materials and might serve as a necessary postemergency program to obviate idleness of capital and money.

Urban blight is destroying city values. Short of nationalizing real estate, government alone cannot solve the problem. Unaided private effort cannot solve it. A partnership between private and public effort is proposed, which can wipe out the mistakes of the past and tremendously strengthen our whole urban economic structure.

## ZONING BY DESIGN

(Continued from page 133)

metropolitan area, where zoning, on the basis of early political and unreasoning demand, was setting aside property for commercial purposes sufficient to care for the needs of a population of over fifty million.

The real result — the valuable result — of zoning to date is the understanding, now becoming quite general, that the only true, permanent, and reliable classification of land use will result from the practice of what is termed "zoning by design," which isn't zoning at all but which arises from the functional design of the land that makes up a city. In the final analysis, (Continued on page 152)

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## ZONING BY DESIGN

(Continued from page 150)

the use to which land will be put will be largely inherent in the land itself by reason of its position in the community and its relations to the facilities which the community provides.

A practical demonstration of land assembly and administrative efficiency is the manner in which the town of Marshfield, Mass., has dealt with the problem arising out of the recent fire which destroyed approximately 500 cottages on its water front. In order to rebuild that section of the town in a manner which would definitely eliminate many of the shortcomings that previously existed, the town adopted the expedient, granted to it by the Massachusetts Law of Excess Condemnation, of acquiring more land than was needed for the actual replanning of the streets. The bill which the Massachusetts Legislature enacted at the behest of the town also authorized the selectmen, after using as much of this property as was necessary for the widening and improvement of streets, to sell the remaining parcels with or without restrictions. The citizens of Marshfield voted their approval of the provisions of the bill at a town meeting.

The state of California, by constitutional amendment in 1929, also made available to itself, its counties, and its cities, the right to employ what is there called "extended eminent domain," a practice which is already being modestly employed in an experimental way by the state's department of highways. More important, however, is the manner in which it is proposed to utilize this method as a means of assembling such lands as are necessary to the design and construction of basic features in a comprehensively replanned metropolitan area.

An incidental result of employing the process of extended eminent domain to accomplish detailed projects is the possibility of completely eliminating the terrific cost of severance damages. This end is accomplished through the simple expedient of acquiring the whole of parcels of land that would otherwise be divided through adherence to the physical limits of an improvement. Of equal importance is the prevention of permanent marginal blight by permitting the consolidation of property fragments contiguous to a major improvement

and translating such fragments into parcels of both economic and utility value. A third result, of tremendous community value, is the opportunity of abandoning legislative control of the use of such marginal property through old-type zoning, with all of its uncertainties and political manipulations, and substituting covenant restrictions that run with the land and are imposed as conditions of title transferred by the public to private holders whether through outright sale or by long-term lease.

Most important in the program for modernizing the whole metropolitan area of Los Angeles from a functional standpoint is the present proposal for progressively constructing various units in a complete network of parkways, or "freeways," already comprehensively planned. Although a modern freeway with its typical forms of marginal development created through these means may readily be visualized, not so obvious to the casual observer is how such a project may extend itself deeper into tributary areas and produce no small degree of complete rehabilitation. If you will picture the laying down of a modern freeway upon the gridiron pattern of any city, it will become evident that such a super thoroughfare literally constitutes a fence separating the portions of the city on one side from those located on the opposite side. In many instances the severance of the erstwhile continuous-street pattern will produce a fringe of dead-end streets. Even under the constitutional limitations in California, a project could be expanded to include a remodeling of these marginal street systems, an action which would carry with it a replatting of the contiguous property. Thus although a community may initiate only a freeway project as such, by expansion of the project along the lines indicated the new thoroughfare does not develop as a scar upon the landscape with varying degrees of blight extending from it in each direction. Rather, by its expansion, it can blend the whole contiguous areas from a utility standpoint so as not only to heal the scar but to produce a complete new basis of land and utility values that may well become a permanent condition increasing in value with time.

The plans now rapidly evolving contain one additional feature: If you visualize a point along a new super parkway where ingress and egress (Concluded on page 154)

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## ZONING BY DESIGN

(Concluded from page 152)

may be had from the tributary areas in the customary form of cloverleaf or one of its modifications, you will be visualizing a terminal and transfer point of considerable importance. Functionally, such points constitute the most logical foci for community centers. Next, mentally picture the expansion of the project so that it includes the redesign of the whole area contiguous to this terminal point in a form patterned primarily to lend itself to commercial purposes. Such a program obviously includes the vacating of present streets and the substitution of new ones, together with the creation of related facilities such as parking accommodations and business sites designed purposely for these uses. Immediately, you sense a center which, in its relationship to the main travel routes of the community and to the tributary areas to be served, assumes the greatest strategic importance. With such administrative locations for essential community services, it is questionable whether thereafter a community could legislatively force business to locate elsewhere. The surrounding areas would forthwith become more practically immune from business intrusion than can possibly be assured through zoning, and thus within the very heart of urban development would be created areas of isolation and tranquillity that would lend themselves permanently secure for residential uses of all kinds.

These types of considerations represent what is meant by the term "zoning by design." They evidence also one form of the assembling of land for purposes of rehabilitation. The important and encouraging considerations connected with them, however, are that in the whole comprehensive concept not one practice necessarily involved has not already proved successful through experience. The only difference between the picture here crudely presented and the practices of the past is the element of co-ordinated employment of the processes and the introduction of public agencies as the motivating influence rather than reliance, as in the past, solely upon unrelated chaotic private initiative. The plan does, moreover, employ the basic principle advanced by Mr. Binns of placing the responsibility upon the public for developing the comprehensive program and then offering to private enterprise much of the task of carrying many of its features into actual practice. Unquestionably the reward to both the individual and the community will be greater and more permanent under such a plan.

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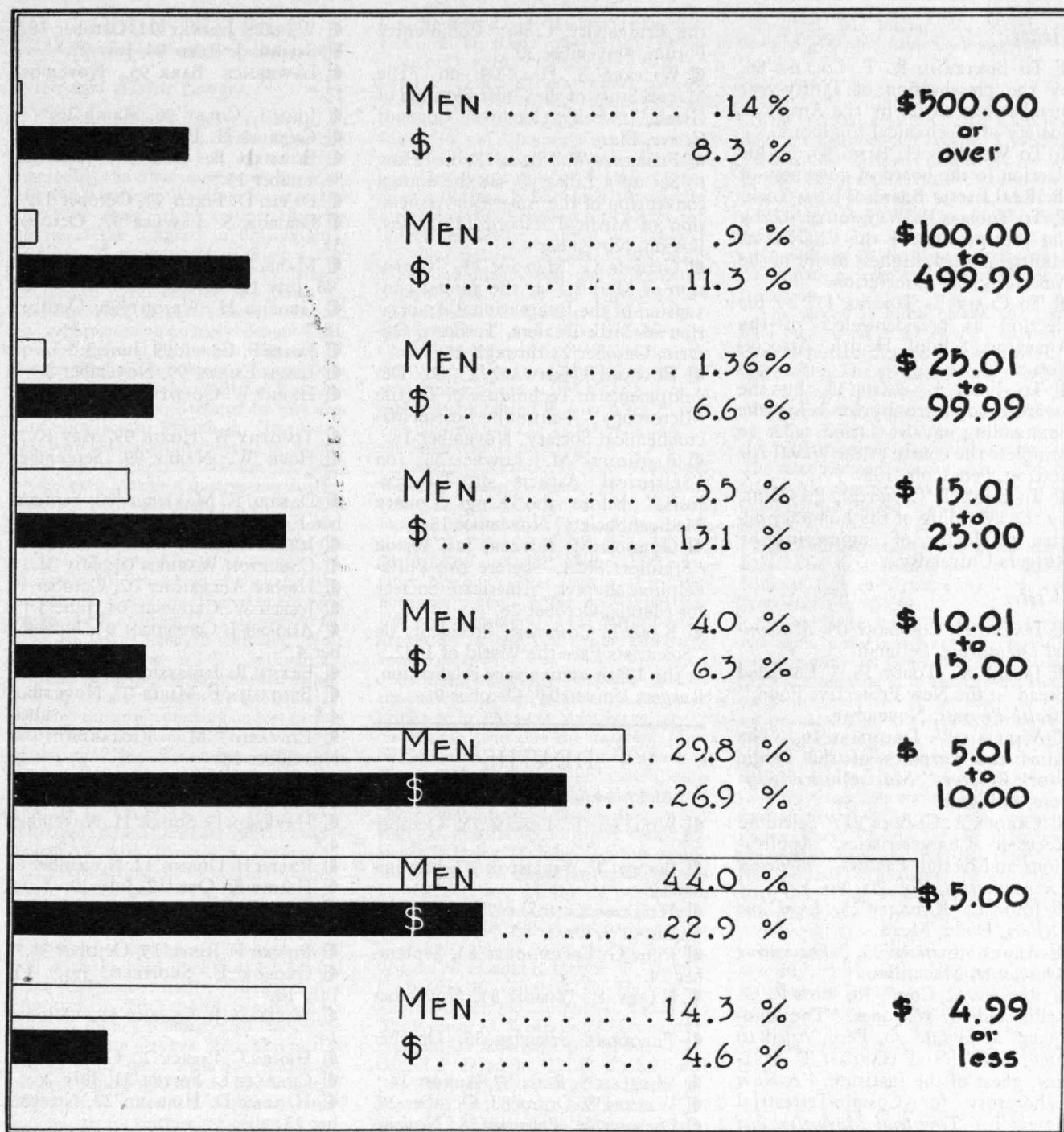
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# TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND—ITS PROBLEMS AND GROWTH



ON DECEMBER FIRST, when the day sheet was posted in the books of the M.I.T. Alumni Fund, the names of 7,150 Alumni had been entered in its pages. Since April, when the Class Agents began their solicitation for the second year of this annual program of giving, these Alumni had contributed \$69,112.86 — concrete evidence of their desire to play an important part in the future of their alma mater. And yet the average of \$9.67, which these figures indicated, did not give a clear picture. More enlightening are those percentages shown in the chart above. Of interest is the fact that though only a twelfth of those who had contributed at that time had done so in excess of the hoped-for \$15.00 average, they were responsible for two-fifths of the total amount.

"How much should I give?" is an oft-heard question. The goal — 10,000 men averaging \$15.00 — is one indication. How close we are approaching that goal is shown herewith.



## ALUMNI AND OFFICERS IN THE NEWS

## Honor

¶ TO BERTRAND R. T. COLLINS '88, by the presentation of a fifty-year membership medal by the American Society of Mechanical Engineers.

¶ TO WILLIAM H. KING '94, by his election to the board of governors of the Real Estate Board of New York.

¶ TO THOMAS R. WEYMOUTH '97, by the presentation of the Charles A. Munroe Award, highest honor of the American Gas Association.

¶ TO CLAIR E. TURNER '17, by his election as president-elect of the American School Health Association.

¶ TO FRED L. LAMB '38, by the awarding of a trophy for being the outstanding naval aviation cadet to complete the course at the Naval Air Station, Pensacola, Fla.

¶ TO KARL T. COMPTON, President, by the awarding of the honorary degree of doctor of engineering by Rutgers University.

## Writer

¶ IRVING H. COWDREY '05, *Mechanical Engineering*, Bellman.

¶ JAMES A. TOBEY '15, "Enriched Bread — the New Protective Food," *Health Progress*, November.

¶ WILLIAM W. DRUMMEY '16, "The Aims and Purposes of the Public Work Reserve," *Massachusetts Selectman*, fall issue.

¶ CAROLE A. CLARKE '21, "Selenium Rectifier Characteristics, Applications and Design Factors," *Electrical Communication*, Vol. 20, No. 1.

¶ JOHN D. RATCLIFF '25, *Lives and Dollars*, Dodd, Mead.

¶ ALVIN SLOANE '35, *Engineering Kinematics*, Macmillan.

¶ RUSSELL C. COILE '38, with P. G. Ledig and M. W. Jones, "The Ionosphere at Huancayo, Peru, April to June, 1941"; and HARLAN T. STETSON, guest of the Institute, "A New Laboratory for Cosmic-Terrestrial Research," *Terrestrial Magnetism and Atmospheric Electricity*, September.

¶ PHILIP FRANKLIN, staff, "The Four Color Problem"; and JESSE DOUGLAS, former staff, "Survey of the Theory of Integration," *Galois Lectures*, Scripta Mathematica.

## Speaker

¶ MICHAEL J. AHERN '06, on "Do We Need a New Deal in Religion?" at

the Bridgeport, Conn., Community Forum, November 30.

¶ WILFRED S. HALE '09, on "The Marvel Story of the Great Pyramid of Gizeh," weekly lectures, Coconut Grove, Fla.

¶ FLORENCE W. STILES '22, on "How to Set up a Library," at the annual convention of the American Association of Medical Record Librarians, Boston, November 4.

¶ GEORGE G. MARVIN '23, "Corrosion of Metals," at the annual convention of the International Association of Milk Dealers, Toronto, Ontario, October 23 through 25.

¶ EDWARD R. SCHWARZ '23, on "Developments in Techniques of Textile Microscopy," before the Boston Microchemical Society, November 18.

¶ ANTHONY M. LOWELL '35, on "Statistical Aspects of Tuberculosis," before the Kings County Medical Society, November 18.

¶ GURDON M. BUTLER, JR., '38, on "Stainless Steel," before the Philadelphia chapter, American Society for Metals, October 28.

¶ KARL T. COMPTON, President, on "Scientists Face the World of 1942," at the 175th anniversary celebration, Rutgers University, October 9.

## DEATHS

\* Mentioned in class notes.

¶ WILLIAM T. LEMAN '73, October 5.\*

¶ BELVIN T. WILLISTON '77, November 19.

¶ WILLIAM KENDALL '78, August 8.

¶ JOSIAH S. DEAN '80, November 23.

¶ JOHN G. EPPENDORFF '83, September 24.

¶ HARRY E. DAMON '85, November 12.

¶ THEODORE STEBBINS '86, October 14.

¶ WILLIAM S. BLISS '87, August 14.

¶ WALTER S. DODD '88, October 26.

¶ DWIGHT H. PERKINS '88, November 2.\*

¶ WALTER F. COOK '90, October 24.\*

¶ LILLIAN BRIDGES ROWELL (Mrs. W. E.) '90, August 13.

¶ HOWARD A. DILL '91, November 22.

¶ GEORGE W. VAILLANT '91, November 19.

¶ DANIEL C. LEWIS '92, September 24.

¶ WARREN JENNEY '94, October 18.\*

¶ SAMUEL J. REED '94, July 22.\*

¶ LAWRENCE BARR '95, November 13.\*

¶ JOHN L. COLEY '96, March 26.\*

¶ CHARLES H. PAUL '96, October 6.

¶ EDWARD B. GORDON, JR., '96, September 13.\*

¶ DAVID D. FIELD '97, October 11.

¶ GEORGE S. LAWLER '97, October 31.\*

¶ MABEL CLAPP LORD (Mrs. F. T.) '98, July 11.\*

¶ GEORGE H. WRIGHT '98, October 18.\*

¶ JAMES F. CLAPP '99, June 3.\*

¶ LEWIS EMERY '99, November 8.\*

¶ HARRY W. GOLDTHWAITE '99, May 8.\*

¶ TIMOTHY W. HOXIE '99, May 10.\*

¶ HOPE W. NAREY '99, September 28.\*

¶ DANIEL E. MAXFIELD '00, September 1.

¶ JULIUS E. OBER '01, April.\*

¶ CARLETON WARREN '01, July 31.

¶ HENRY ALLBRIGHT '02, October 1.

¶ JOSEPH W. CROWELL '04, June 5.\*

¶ ADOLPH J. ORTSEIFEN '05, November 4.\*

¶ FRANK R. INGALSBE '06, June 18.

¶ BENJAMIN F. MILLS '07, November 4.\*

¶ EDWARD M. RICHARDSON '07, November 16.

¶ WILLIAM A. ADAMS '08, November 14.\*

¶ HARRISON D. SOULE '11, November 4.\*

¶ RALPH H. DOANE '12, November 6.

¶ HENRY N. OTIS '12, July 20.

¶ JAMES B. FRANKS, JR., '15, November 5.\*

¶ PIERRE F. JONES '15, October 31.\*

¶ GEORGE E. SKOFIELD, JR., '15, July 10.\*

¶ WILLIAM J. CLARKE '18, October 14.

¶ HENRY C. PIERCE '20, October 23.\*

¶ CHARLES L. FOSTER '21, July 26.\*

¶ HARLAN D. HIBBARD '27, November 23.

¶ WINTHROP T. NOYES '30, October 30.

¶ HAROLD F. T. DAVIES '35, September 9.\*

¶ RICHARD K. KOCH '38, September 23.

¶ ABBOTT S. MAEDER '38, September 21.\*

¶ JOHN E. HOUPIS '41, February 2.

## NEWS FROM THE CLUBS AND CLASSES

## CLUB NOTES

*National Metal Congress*

Defense problems were emphasized in the technical programs of the American Institute of Mining and Metallurgical Engineers, the American Society for Metals, the American Welding Society, and the Wire Association, co-operating societies at the congress in Philadelphia, October 20 through 24. Taking active part in the American Society for Metals conference were: Bradley Stoughton '96, President-elect of that society, who led the group meeting on molybdenum high-speed steels and tool steels; Edward T. Barron '05, whose subject, "Suggestions About Substitutes that Will Not Run into Other Bottlenecks," related to low carbon alloy steels; Marcus A. Grossmann '11, who led the group meeting on higher alloy steels; Ralph T. Hanson '11, who spoke on "Marine Construction Inspection"; John R. Freeman, Jr., '16, on "Use of Copper Alloys as Alternates for Scarce Metals" and "Uses of Copper-Silicon and Other Copper Alloys"; Albert W. Demmler '20, "Function of Nickel, Chromium and Vanadium That Are Scarce"; Augustus B. Kinzel '21, "Alloys Available to Give Strength Without Heat Treatment"; John W. W. Sullivan '23, who led the group meeting on the inspection of metals; Gordon T. Williams '23, who led the group meeting on low carbon alloy steels; Hermann H. Zornig '23, who spoke on "Heat Treatment of Shells"; Arthur F. Underwood '26, on "Bearing Substitutes in the Automotive Industry"; Herbert H. Uhlig '32, on "The Role of Nitrogen in 18-8 Stainless Steel"; Morris Cohen '33, with Bernard S. Lement '38, "The Tempering of Two High Carbon, High Vanadium High Speed Steels," with Paul Gordon '40, "The Transformation of Retained Austenite in High Speed Steel at Sub-Atmospheric Temperatures," and with Richard A. Flinn, Jr., '37 and John Chipman, staff, "The Acicular Structure in Nickel-Molybdenum Cast Irons." John Chipman also spoke on "The Carbon-Oxygen Equilibrium in Liquid Iron," and, with Karl L. Fetter '40, on "The Solubility of Iron Oxide in Liquid Iron." Leslie S. Fletcher '33 was summarizer for the group meeting on copper and its alloys and was on the convention committee in charge of local arrangements; and Gordon M. Butler, Jr., '38 spoke on "Study of Dimensional and Other Changes in Various Die Steels Due to Heat Treatment."

Alumni who participated in the A.I.M.E. conference were: Alfred V. de Forest '11, who, with Charles W. MacGregor, staff, and Arthur R. Anderson '35, spoke on "Rapid Tension Tests Us-

ing the Two-Load Method"; Augustus B. Kinzel '21, who spoke on "The Evaluation of Ductility of Steels for Welding"; Cyril S. Smith '26, on "Effect of Cold Work and Annealing upon Internal Friction of Alpha Brass"; Richard F. Miller '34, on "Influence of Chromium and Molybdenum on Structure, Hardness and Decarburization of 0.35% Carbon Steel"; William B. Shockley '36, who led a round-table discussion on "Order-Disorder Phenomena"; Puzant W. Bakarian '37, who spoke on "Preferred Orientation in Rolled Magnesium and Magnesium Alloys"; and Blake M. Loring '37, on "Mechanical Properties of Iron-Manganese Alloys" and "The S-Curve of a Chromium-Nickel Steel." Charles H. Herty, Jr., '21 was in charge of the annual dinner of the A.I.M.E. and acted as toastmaster. Leland R. Van Wert '25 was vice-chairman of the local committee for the Philadelphia meeting.

Alumni speakers at the American Welding Society were: H. Malcolm Priest '12, on "Design of the World's Largest Welded Flat Car"; Augustus B. Kinzel '21, on "The Specification of Weldability of Steels"; Harry E. Rockefeller '22, on "Billet Cutting for Steel Forgings"; and George S. Mikhailapov '26 on "Structural and Metallurgical Properties of the Condensor Discharge Spot Welds."

At the Technology luncheon held at the conference, Carl F. Floe '35, Assistant Professor of Physical Metallurgy, spoke on work in general at the Institute. Morris Cohen '33, also Assistant Professor of Physical Metallurgy, talked more specifically on the work of the Department. Others who attended the luncheon were: Harry B. Pulsifer '03, Philip H. Chase '09, Henry F. Daley '15, John R. Freeman, Jr., '16, William H. Bassett, Jr., '19, George H. LeFevre '21, Philip M. Alden '22, VanDorn C. Smith '22, Edward J. Healy '23 and W. W. DuComb, Vincent C. Lysaght '24, Elton E. Staples '26, Evan F. Wilson '26, Harold L. Geiger '28, Thomas E. Guerin '28, Thomas G. Harvey '28, Mieth Maeser '28, Laurance F. VanMater '28, George N. Wedlake '28, Leonard C. Peskin '29, Howard B. Huntress '31, Daniel P. Dyer, Jr., '32, E. Rolf Morral '32, Herbert A. Uhlig '32, Bruno H. Werra '32, Robert A. Hentschel '33, Richard F. Miller '34, Victor G. Mooradian '34, Alexander A. Rostartchuk '34, and Albert M. Talbot '34.

Also present were: John P. Brosnahan '35, Jacob Leeder '35, Edward L. Bartholomew '37, Norman A. Birch '37, Richard A. Flinn, Jr., '37, Robert B. Gordon '39, Peter E. Kyle '39, Walter C. Kahn, Jr., '40, Gerhart Schindler '40, Frederick G. Stroke '40, Edgar E. Hayes '41, Francis B. Herlihy '42, Robert T. Howard '42, John T. O'Connor '42, Edward L. Pepper

'42, Paul W. Sommer '42, Morris A. Steinberg '42, and Alvin G. Waggoner '42.

*M.I.T. Club of Akron*

The first fall meeting of the Club was held on October 27 at the Y.M.C.A. Twenty-two members turned out for the dinner. The special feature of the meeting was a talking moving picture, "Oil for Aladdin's Lamp," which was sponsored by the Shell Oil Company, Inc. The picture contains an excellent description of developments from research by the Shell Company.

The second meeting of the year was held on November 17 at the University Club. Fourteen members were present at the dinner. The speaker of the evening, Harry Bennett, Executive Secretary of the Akron Chamber of Commerce, spoke on civilian defense in modern war and what the civilian population can do about it. The personnel and functions of each of the advisory committees of the Akron Civilian Defense Board were explained in detail.

The annual election of officers has been held. The new leaders are: President, James B. Holden '30; Secretary-Treasurer, Wendell K. Fitch '36.

George H. Reynolds '28, division superintendent of the Goodyear Tire and Rubber Company in Granville, New South Wales, Australia, is in the United States on a vacation. George attended the October meeting of the Club. He gave a short, interesting talk on life in Australia.

John R. Oakley '26, who is in the development department of the Goodyear Company, has been transferred to the São Paulo, Brazil, factory. He replaces Laurence H. Coffin '27, who has been transferred back to Akron. Harry E. Heiligenthal '34 has accepted a position with the Goodyear Company in the mechanical goods division and is now in the Akron district.

The wives' group of the Club hold monthly meetings at the homes of the members. — JAMES E. CONNOR '23, *Retiring Secretary*, 1746 13th Street, Cuyahoga Falls, Ohio. WENDELL K. FITCH '36, *Secretary*, 695 Schiller Avenue, Akron, Ohio.

*M.I.T. Club of Buenos Aires*

With thirty-six members, the Club was founded on September 11. At the first annual meeting, held October 9, the following officers were elected: Arthur F. Bennett '03, President; John H. Flynn '05, Vice-President; and Roberto J. Ottonello '22, Secretary-Treasurer. The executive committee is composed of these officers and José C. Bertino '23.

Luis A. Artola '22 brought greetings from Montevideo. An agreement was



made that once a year a meeting of the Club would be held in Montevideo, and once a year the Tech men from Montevideo would come to Buenos Aires. — ROBERTO J. OTTONELLO '22, *Secretary*, Azcuena 1031, Buenos Aires, Argentina.

### *M.I.T. Association of Buffalo*

The Association held its first fall meeting on October 30, when seventy members met for dinner. They later visited the Bell Aircraft Corporation plant in Buffalo. The tour proved exceptionally interesting, as the Airacobra could be seen in its various stages on the production line.

On November 12, the Niagara Falls Technology Club invited the Buffalo Club to a joint meeting. After dinner the group was entertained by colored movies of Technology. — The big stag party of the year was held on December 12 at the University Club in Buffalo. Swimming, bowling, cards, buffet supper, and a good time in general drew a large attendance. — BERNARD H. NELSON '35, *Secretary*, 21 Anderson Place, Buffalo, N.Y.

### *Technology Club of Fall River*

At a meeting of the Club held on November 5 at the Quequechan Club, Horace S. Ford, Treasurer of the Institute, spoke about recent developments at Technology. We realized from his talk that great improvement has been made in the educational, athletic, and cultural opportunities for students. Technology is co-operating to the fullest extent in the national defense effort. — Mr. Ford's colored moving pictures, followed by highlights taken from the Treasurer's annual report, made us justly proud of Technology and its excellent leadership.

An informal business meeting was conducted by Bob Ashworth '25. After a talk by Charlie Locke '96, Alumni Secretary, we decided to hold at least three or four meetings each year and to make a survey of our membership to bring our records up to date. — We all missed our Secretary, Bob Stuart '22, who has moved to Pawtucket, R.I. At the request of our President, R. F. Haffenreffer '95, I shall try to fill Bob's place until an election is held.

In the responses to our letter announcing the meeting mentioned above, we learned that Philip Caplain '22 is now located at Great Neck, Long Island, N.Y.; Francis R. Storey '41 is at 611 Company Street, York, Pa.; and Matthew D. Sullivan '31 is at 1312 North Cleveland Street, Arlington, Va. — ROBERT F. BURNETT '10, *Secretary*, 242 Lincoln Avenue, Fall River, Mass.

### *Technology Club of Central Pennsylvania*

The fall meeting of the Club was held on October 29 in Lancaster, Pa. Wilson Wright, an economist, gave extremely interesting comments on an engineer's place in the changing economy. Many members from the outlying centers of York and Harrisburg enjoyed our speaker, exchanged ideas on his subject, partook of

the best of food, and renewed the friendships interrupted since our April meeting.

Mr. Wright was generous in answering the many questions that resulted from the conclusions at which he arrived as well as in his forecasts as to the direction of change in our future cultural and economic life. Needless to say, his comments as to the present economic state of this country made us very thoughtful. He pointed out that the engineer, in his effort to make our economy more efficient, is serving admirably to consolidate more firmly the managed economy toward which we are headed. The intensive defense effort in which this country is now engaged is only, unconsciously perhaps, speeding us faster toward this goal.

At the conclusion of the talk and the discussion, Frank A. Robbins, Jr., '02, President, thanked Mr. Wright in behalf of the Club. — The Alumni and friends who attended were: Louis S. Morse '96, Edgar A. Weimer '98, Frank A. Robbins, Jr., '02, Percy E. Tillson '06, Carl W. Gram '09, George E. Hodge '13, Clifford J. Walton '14, Gardiner C. Wilson '15, Eldor J. Mink '22, Charles K. Miller '23, Breese J. Stevens '23, Raymond L. Bowles '24, Francis A. J. Brown '26, Giles E. Hopkins '26, Emil T. P. Neubauer '33, Richard A. Lazarus '41, Francis R. Storey '41, and John T. Hummer. — GARDINER C. WILSON '15, *Secretary*, Armstrong Cork Company, Engineering Department, Lancaster, Pa.

### *Technology Club of Kentucky*

On October 29, nineteen Alumni met in Louisville for a "Tech Revival" dinner meeting. Frank D. Rash '01 gave a fine talk, which was followed by a discussion on how to put Technology on the map again in Louisville. The decision was made to make dinner meetings bimonthly affairs, with one each year an outstanding event. We also decided to hold weekly luncheon meetings at the French Village each Monday at 12:15 P.M. A home-coming dinner meeting for students and Alumni was scheduled for December 29 at the Canary Cottage in Louisville.

A news bulletin has also been started in Louisville for Tech Alumni. Elmer A. Skonberg '29 of the program committee has kindly furnished the report of the October 29 dinner. Others who attended were: Richard S. Ayres '09, Julian K. Ferguson '15, Charles E. Breitbeil '22, Walton T. Davis '23, Harvey M. King '23, Theron P. Bailey '24, Onslow S. Robinson '25, Albert L. Entwistle '26, Melvin Sack '28, Stephen C. Gawlowicz '31, Tinsley W. Rucker, 3d, '31, Wallace S. Crowell '32, Allan K. Cook '34, Albert J. Klemka '36, Albert Musschoot '36, Thomas P. Nelligan '36, and Douglas W. Crawford '40. — JAMES R. HANCOCK '24, *Secretary*, Lewis and Hancock, 314 Armory Place, Louisville, Ky.

### *Technology Club of New Hampshire*

The annual meeting of the Club was held at the Eagle Hotel in Concord on

Thursday, November 13, with Malcolm C. Mackenzie '14 presiding. During the dinner, the following nominating committee was appointed: Walter M. Africa '15, Harold E. Langley '19, and Blaylock Atherton '24. From the recommendations of this committee, the following officers were elected: President, Carl A. Hall '08; Vice-Presidents, Samuel P. Hunt '95, Robert C. Erb '17, and Richard S. Holmgren '19; Secretary-Treasurer, Horace A. Emerson '27, and representative to the Alumni Council, Malcolm C. Mackenzie.

Charles E. Locke '96, Alumni Secretary, spoke of the new activities at the Institute. He gave a summary of the operations of the Alumni Fund installed nearly two years ago and told about the defense training courses. He stated that the staff has been doubled and that 10 per cent of the spare space at the Institute had been utilized for this training.

The principal speaker of the evening was B. Alden Thresher '20, director of admissions and Associate Professor of Economics at the Institute. He elaborated on the work being done for defense, stating that only work that can be done in the Institute buildings is accepted. He told of the differences between the present training and that of the first World War. Professor Thresher also spoke of the method for selecting students by interviews. Personal characteristics and engineering qualifications are as important as scholastic ability. The problem of obtaining new students from the entire country was discussed.

The members of the Club were very sorry that John Bunker, Dean of the Graduate School, was unable to attend because of illness. — Those present at the meeting, other than those mentioned, were: Arthur J. Conner '88, Norwin S. Bean '94, Samuel P. Hunt '95, Henry D. Jackson '95, Arthur O. Roberts '04, Herbert W. Olmsted '05, William G. Abbott '06, Carl A. Hall '08, Louisa Macdonald Norton '13, Edmond W. Bowler '14, Leigh S. Hall '14, Herbert D. Swift '15, Robert C. Erb '17, Clarence G. Holt '17, Philip F. Maher '17, Paul W. George '22, C. Randolph Myer '22, James R. Geddes '25, E. Sterling Pratt '26, Charles Rich '26, Horace A. Emerson '27, Edward R. Atkinson '33, Eugene F. Magenau '34, Richard H. Koehrmann, Jr., '38, Joseph G. Zeitlen '39, Richard I. Barnard '41, and R. D. Esten. — HORACE A. EMERSON '27, *Secretary*, 196 South Street, Concord, N.H.

### *Technology Club of New York*

The annual club bridge tournament was won this year by Mike Radoslovich '26. As part of his winnings, Mike received a handsomely engraved silver loving cup. His name will appear on the base of the Dick Ranger Trophy in company with the illustrious victors of bygone years. A substantial cash prize completed Mike's spoils. Second in the contest was Al Bassett '26, who received part of a case of Scotch for his fine showing. Elmer Hughes '31 copped third place and a smart Knox headgear. Fourth and fifth to finish

were Asher Weil '01 and Bill Latham '26, respectively. The contest was hard fought all the way, with the lead changing hands several times. Next year's battle is already being discussed over the autopsies of the outstanding hands in this tournament.

The guest of honor at the fall smoker at the Club on December 4 was Horace S. Ford, Treasurer of the Institute. A hilarious comedy, "Nickelodean Knights," was presented as the lighter side of the evening's events.

Plans have been completed for the American Society of Civil Engineers' luncheon which will be held at the club on January 22 in conjunction with that society's annual convention in New York. A large turnout is expected.

The New England Thanksgiving, in place of the New York Franksgiving, was celebrated by the Class of '24 at a luncheon at the club on November 27. A real Thanksgiving dinner with turkey and all the fixin's was enjoyed by all. — WILLIAM D. NEUBERG '17, *Secretary*, 24 East 39th Street, New York, N.Y. — CONSTANTINE S. DADAKIS '34, *Publicity Committee*, 644 Riverside Drive, New York, N.Y.

### *Niagara Falls Technology Club*

A joint meeting of the Niagara Falls Club and the M.I.T. Association of Buffalo was held on November 12 at the Niagara Club. Thirty-four men attended.

After a very good dinner, Lauren B. Hitchcock '20, President of the Niagara Falls Club, reviewed some interesting news of Technology, gleaned from *The Tech*. Hitchcock was followed by Harry L. Noyes '90 who presented his recollections of the power situation as it was when he first arrived here in the Nineties.

Songs of Technology, led by Michael G. Kelakos '35, ushered in the main event of the evening, colored movies of the new buildings of the Institute. — The evening was a big success; we hope to have another meeting in the near future. — Thanks go to Thomas F. Twomey '33 for acting as secretary for this meeting. — JOHN P. HAMILTON '36, *Secretary*, 111 84th Street, Niagara Falls, N.Y.

### *Technology Club of Philadelphia*

The first meeting of the fall season was held on Thursday, October 23, at the Philadelphia University Club, with 135 members present, one of the largest attendances in years. A 50-year graduate, Elisha Brown Bird '91, was present.

Karl T. Compton, President of the Institute, was the guest speaker. In his usual delightful manner, he related the important work being carried on at Technology in connection with national defense. He outlined the tremendous amount of research on short-wave radio now under way and the intensive training of over 900 emergency students who are taking a six-month course in meteorology, airplane and engine design, ship design, and mechanical inspection work. What he didn't tell us was even more intriguing, as

much of the research now being undertaken is of a confidential nature.

Ernest M. Pace, Jr., '13, a captain in charge of the naval aircraft factory at the navy yard in Philadelphia, preceded Dr. Compton with a few remarks. — In the absence of our President, William W. Quarles '24, who was called into active service in the Army last summer, the affairs of the Club are being administered by Philip M. Alden '22, Vice-President. — We are planning another dinner in January and had a luncheon for M.I.T. students in this area during the Christmas recess.

We regret to announce the death on November 5 of our good friend and member, Jim Franks '15, after a lengthy illness. — GEORGE T. LOGAN '29, *Secretary*, 1000 Chestnut Street, Philadelphia, Pa. — HENRY F. DALBY '15, *Review Secretary*, B. F. Sturtevant Company, Cresmont and Haddon Avenues, Camden, N.J.

### *Technology Club of Rochester*

On Monday, November 17, Rochester Alumni held a luncheon at the University Club to hear Karl T. Compton speak. The sixty members present heard his account of the Institute's defense activity, for which about four hundred technical men have been assembled. This number is in addition to the regular staff, most of whom are devoting some of their time to defense. More than forty projects occupy upwards of a hundred thousand square feet of floor space. Two important divisions of the work are headed by two professors — Noyes and DuBridge — of the University of Rochester.

Dr. Compton described the new chemical engineering laboratory as one of the finest in the country. It will be occupied for the duration by the Chemical Warfare Service. — WINFIELD PARTRIDGE, JR., '33, *Secretary*, 76 Magee Avenue, Rochester, N.Y.

### *Technology Club of the Connecticut Valley*

Since the September gathering of the Club at the Hofbrauhaus in West Springfield was such a success, a similar get-together was scheduled for the winter meeting. Thus, on Wednesday, December 3, Tech men from in and about Springfield congregated at the Edelweiss Chalet from 7:00 P.M. until the wee small hours.

The speaker of the evening was Carl H. Lovejoy '10, who talked and showed movies on the construction of Westover Field, and Connecticut Valley flood control. The population at the meeting was enhanced by members of the Technology Club of Hartford, who were invited as usual to carry on the policy that the two clubs have established of enjoying each other's meetings.

John G. Wheale '38, the very popular and likeable Secretary of the Club for some time past, has been transferred by the Ordnance Department to the New Haven suboffice of the Hartford Ordnance District and so has had to resign his secretarial post. This transfer is a promotion

for Gus, as he has been put in charge of the New Haven office. We miss him, but are happy for his sake that he got the transfer. John F. Sexton '41 is taking his place for the present. — JOHN F. SEXTON '41, *Secretary*, 126 Maplewood Terrace, Springfield, Mass.

### *Washington Society of the M.I.T.*

At the October meeting, Merton Emerson '04, our President, announced that Allen McDaniel '01 had offered his Leesburg, Va., estate for the permanent location of our June picnic. He also commented on the large turnout at the September meeting, which was held at the Washington National Airport, and announced the new officers and the executive committee for this year. The committee has fixed the fourth Friday of each month as the meeting date, and the meetings will continue to be held at the Y.W.C.A., 17th and K Streets, Northwest.

Following appropriate introductory remarks regarding China, Mert introduced Shih Ming Chu '26, II. Major General Chu is the military attaché to the Chinese Embassy. He spoke briefly about M.I.T. clubs in China, stating that the Nanking and Shanghai clubs on occasion had hundreds turn out for their meetings. Several years ago, at a picnic at West Lake, Hangchow, over 300 Technology Alumni heard Dugald C. Jackson, Professor Emeritus at M.I.T. The war brought many engineers to the interior, and at the time Marshall C. Balfour '19 visited Chungking in 1939, fifty Alumni gathered together. An M.I.T. club was organized, with the vice-minister of education as president and General Chu as secretary-treasurer.

General Chu introduced Hu Shih, the Chinese ambassador, as a scholar and great teacher. Dr. Hu studied in this country for some time, and he has honorary degrees from many American universities. He outlined the growth of democracy in China. It was no accident, he said, that China overthrew the monarchy and established a republic thirty years ago, because this movement had its roots deep in history. Through the years, feudalism has been broken, primogeniture has been abolished and property divided equally among descendants, and civil service has been established. The primary test for a civil service position originally was local recommendation; later the test became ability in poetic composition. By this means, the sons of the very poor could achieve the highest posts of honor and power, since copies of the classics had been produced at a very low cost. The classics emphasized the importance of freedom of speech and encouraged outspokenness to the extent of fighting for principles regardless of obstacles. Reason was advanced as a guiding spirit in Chinese life, and the power given the censors promoted the consideration of man as supreme.

Dr. Hu outlined the growth from the confederacy to the Federal form of government, calling attention to the similar-



ity in the experience of this country. He emphasized the difficulties China is having at present. In closing, he stated that China had to go through the military stage of civil war as we had, the stage of feudalism, and that it is now headed for freedom and democracy in spite of all obstacles.

The following Alumni and guests enjoyed Dr. Hu's talk and the dinner: C. Leonard Brown '88, Sanford E. Thompson '88, George W. Stone '89, John G. Crane '90, Joseph E. Thropp, Jr., '94, Charles G. Abbot '94, Joseph W. Clary '96, Proctor L. Dougherty '97, Charles H. Stratton '00, John Boyle '01, Stanley C. Sears '01, W. Lorrain Cook '03, Frank W. Milliken '04, George N. Wheat '04, Merton L. Emerson '04, Kenneth P. Armstrong '10, Holman I. Pearl '10, Carl G. Richmond '11, Aubrey D. Beidelman '15, John W. Conover '15, William C. Mehaffey '17, Hamat D. Manuelian '18, Louis J. Grayson '19, Lawrence W. Conant '21, William K. MacMahon '22 and guest J. F. Abel, James R. Morton, Jr., '22, William E. R. Covell '23, Raymond P. Schreiber '24, George D. Fife '24, John D. Fitch '24, George E. Lamb '24, Harry B. Swett '25, Theodore L. Soo-Hoo '26, Roland L. Hutchings '28, M. Waldo Keyes '28, Carroll C. Smith '28, Ludwig C. Hoffmann '29, Nicholas P. Stathis '29, John A. Plugge '29 and guest C. H. Plugge, Alfred F. Bird '30, Jack R. Bloom '30, Mary E. Forsberg '30, James George '30, Leo J. O'Neill '30, Mario V. Caputo '31, Charles E. Loucks '31, Harold A. Traver '32, Manley St. Denis '32, M. Elsa Gardner '33, Donald R. Neil '33, Samuel Joroff '34, Hamilton H. Dow '35, Blake D. Mills, Jr., '35, Leroy C. Hutchinson '37, Ira H. Lohman, Jr., '38, August T. Rosano, Jr., '38, C. Ronald Smith '38, Waldron S. Macdonald '38, Richard H. F. Stresau '38, James Andrias '39, William H. Deering '39, John E. Greenhalgh '39, Frederick F. Schaller '39, Robert S. Harper '40 and guest, William G. Osmun '40, George B. Waterhouse, staff, and B. H. Tower. — AMASA M. HOLCOMBE '04, *Secretary*, Apartment 202, 3024 Tilden Street, Northwest, Washington, D.C. WILLIAM K. MACMAHON '22, *Review Secretary*, Rosslyn Gas Company, 3240 Wilson Boulevard, Arlington, Va.

## CLASS NOTES

### 1873

William T. Leman died at his summer home in St. Petersburg, Pa., on October 5 after a three-day illness. He was ninety years old. Leman was born in Charlestown, Mass., on July 20, 1851, and later moved to Chelsea, Mass. The last six years he spent his winters in St. Petersburg, Fla.

Leman spent all his professional life in the chemical and oil industry, for forty-seven years in oil refining. He was retired from the Texas Company in 1924 at the age of 73.

In 1876, Leman married Ella C. Palmer of Chelsea, who died in 1906. A son died

in 1934 and a daughter in 1937. In 1909, he married Ella Klingler of St. Petersburg, Pa., who survives him. He also leaves a son-in-law and a daughter-in-law, five grandchildren, and one great-grandson. — GEORGE M. TOMPSON, *Secretary*, 15 Pleasant Street, Wakefield, Mass.

### 1887

Since the death of our classmate William B. Douglas in 1940, your Secretary has been endeavoring to secure a sketch of his life and business career, but without success. A recent communication to the *Press* of Middletown, Conn., however, has revealed the following obituary which was published in that paper on September 20, 1940: "William B. Douglas died at his home, 110 High Street, . . . at the age of 77 years after a long career here, his latter days having been spent in retirement from active affairs. Mrs. Douglas died about three years ago. Mr. Douglas was born in Middletown, son of Joseph W. and Julia W. Dobney Douglas. He attended . . . Technology in the class of 1887, and while there was elected to the honor fraternity Theta Xi. In his early business days Mr. Douglas entered the famous W. & B. Douglas company and eventually was vice president. The company passed in 1924, having been founded in 1832. For some years Mr. Douglas has passed his winters in Florida."

Letters recently received from Herbert Wilcox and Lonsdale Green express much interest in the approaching fifty-fifth anniversary of the Class and their approval of the selection of Marblehead once more as the site for our reunion. Wilcox refers to a recent account of a serious fire in Aspen, his home town in Colorado. The decadence of the mining industry has apparently reduced the town's population from an estimated 15,000 in the boom days to a reputed 700-odd at the present time. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

### 1888

Dwight Heald Perkins, nationally known architect and winner of the long-distance medal at our fiftieth reunion, died in Lordsburg, N.M., on November 2. He was born in Memphis, Tenn., and entered Technology with our Class as a sophomore in the fall of 1885. He remained with us for two years only and started on his remarkable architectural career in 1888 with George A. Clough, architect, Boston. From 1889 to 1894 he was with Burnham, Root and D. H. Burnham, architects of the first World's Fair in Chicago.

Perkins was a member of the special park commission of Chicago from 1899 to 1910 and of the plan committee, Forest Preserve Commission, district of Cook County, from 1916 to 1922. He was designer of more than 200 public buildings in the Chicago metropolitan area, and 100 golf courses were included in his plans for the extension of the forest preserve in Cook County. Perkins was a fellow of the American Institute of Architects, a member of the Architects Club of Chicago, the

Cliff Dwellers Club, and City Club of Chicago. He was one of the most brilliant architects in the Chicago area, and although his hearing was very much impaired during the last ten years or more, so that he could not attend meetings, he still maintained to the end his membership in the societies mentioned above. He will be sadly missed by those friends and classmates who knew him well.

Nathaniel T. Very, efficient Secretary of the Class of '87, writes that while in Duxbury recently he attempted to get in touch with two '88 men, but failed. Charlie Sabine spends his summers in Duxbury and winters on Hammond Street, Chestnut Hill; and Johnnie Runkle spends most of his time in Duxbury except for a few winter months in his old home in Cambridge. — A short visit to the home of William Besler in Plainfield, N.J., only twenty-five miles from Princeton, revealed to your Secretary the fact that Besler has a very attractive estate with a large colonial mansion, extensive gardens, and a conservatory. We hope his health continues to improve.

The Register of Former Students advises us that Benjamin C. Lockett of New York City, from whom we had not heard during the last forty-three years, died in November, 1938. He was with us during our freshman year only. — BERTRAND R. T. COLLINS, *Secretary*, 39 Wiggins Street, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary*, Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston, Mass.

### 1890

When the Secretary tried to call on Harry Goodwin at his old office at M.I.T. recently, he was met at the entrance to the corridor with a stony stare. This whole section is now given up to the radiation laboratory, and apparently no one is allowed to even look down that corridor. Goodwin's office has been moved to Room 4-242.

Walter F. Cook died on October 24 in Boston. He had continued the catering business founded by his father in 1866, the oldest catering business in Boston. At the time of his death he was still president of the company. Besides holding membership in the Highland Club of West Roxbury and the Rotary Club of Boston, he had been president of the Unitarian Club of Boston. In recent years we had not seen much of him, although he frequently attended class meetings for the first twenty-five or thirty years after graduation.

The Secretary had a visit recently from Willard Roots. Theoretically, Willard has retired, but practically he is as busy as ever, being called upon for services at various churches through New England. — Your Secretary was interested to read in an article by Herbert Hoover in a recent *Saturday Evening Post* how he had used William Poland's services in securing engineering information in Europe at the time of the peace conference after the last War.

The Secretary has received the regular appeal from the Advisory Council on

1890 Continued

Athletics for a contribution to the Athletic Fund. The class fund is not sufficient for contributions for this purpose, but we are glad to pass along the appeal. Contributions may be sent to Ralph T. Jope '28, Treasurer, Room 3-219, M.I.T.

We congratulate H. M. Waite on his election as an honorary member of the American Society of Civil Engineers. — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 4-242, M.I.T., Cambridge, Mass.

## 1892

The time for our golden anniversary is rapidly drawing near. In a few months, members of this wonderful Class will be turning their steps from every corner of the country toward Cape Cod and Cambridge, where they'll enjoy several glorious days of fun and fellowship — days packed with action, inspiration, and enthusiasm.

The committee for this anniversary has been busy making plans. Be on the lookout for a letter with an enclosure telling all about it. Start making your plans now to be there with the rest of the good fellows on June 6 to 9. — CHARLES F. PARK, *Secretary*, Room 5-111, M.I.T., Cambridge, Mass.

## 1894

The meeting of the Association of Textile Chemists at Pinehurst, N.C., in October brought together Harold Chase, Alan Claflin, and Leonard Tufts. Tufts is the grand old man of Pinehurst, which was founded by his father. Through the activities of Leonard and his sons, it has become one of the greatest and most attractive resorts in America. Claflin and Chase were attending the chemists' meeting in their professional capacities. Alan is a supersalesman and an expert on chemicals and chemical processes. Chase is dean of the textile chemists of the South and is chief chemist and superintendent of dyeing in the great Riverside and Dan River Cotton Mills at Danville, Va. According to Claflin's report, Tufts was the perfect host, and the occasion was one of extreme satisfaction to the triumvirate. Probably the three had not met since Tech days nearly fifty years ago, and the pleasure they had in meeting again is a fine example of the way in which our student associations and friendships endure through the years.

Tufts has spent most of his life at Pinehurst and does not return to his farm at Meredith, N.H., for summers, as was formerly his habit. He has retired from the active management of Pinehurst, which is now run by his sons. Leonard lives in a near-by mansion, and, as a sort of overlord of the manor and the corporation and head of the clan (he has ten grandchildren), spends his days in the numerous interests and enjoyments that command the attention of those of us who are approaching three score and ten. We shall count on seeing Tufts at our fiftieth anniversary reunion in 1944.

In the notes in the November Review, I mentioned an article about W. H. Pratt

which had appeared in a New York paper. On April 30, the Engineering Societies of New England gave him its first award for outstanding achievement in the engineering profession, in recognition of his many inventions, his forty years of association with the General Electric Company, and his contributions of technical articles to engineering magazines. Having now passed the age of retirement, Pratt refuses to be idle and at present is rendering valuable service as a consultant in the development of important technical equipment in the national defense research activities.

Arthur Patrick has again demonstrated his fine organizing ability in revamping the financial structure of the Cleveland Automatic Machine Company, of which he was formerly executive vice-president and treasurer. Last April, Patrick was elected president. His son, George V. '28, is one of the vice-presidents. Patrick's home address is 2194 Ambleside Drive, Cleveland, Ohio.

Harry Bates, who ever since graduation has been associated with the International Agricultural Corporation and has lived in Atlanta, has changed his address to East Point, Ga.

The death of Albert H. Sawyer was reported briefly in my earlier notes. Sawyer died at his home in Newburyport on April 18 at the age of seventy. He had been senior director of the Mergenthaler Linotype Company and former treasurer of the Florida Atlantic Coastline Canal. He is survived by a son, Haydn Page Sawyer, of Brooklyn.

On July 22, at his home in Nehalem, Ore., Samuel Gordon Reed died in his sleep, following a heart attack. He was sixty-nine years old. Sam was born in Rockland, Mass., April 27, 1872, and, after graduation, was on the staff of the Department of Mechanical Engineering at M.I.T. for two years. He later became superintendent of the Crosby Steam Gauge and Valve Company. In 1902 he went to Portland, Ore., as treasurer of the Portland Electric Power Company. He resigned six years later to act as superintendent of the Oregon Trust and Savings Bank's receivership proceedings.

In 1911, Sam moved to the West Coast, purchasing a large tract of land fronting on the Pacific, where he opened the Neahkahnie Tavern and began raising sheep. Almost immediately he began to stress the need for better roads in that section. He served as the road commissioner of Tillamook County and was for many years chairman of the Oregon Coast Highway Association. In his honor, a span over Neahkahnie Creek on the mountain of the same name was officially named the "Sam G. Reed Bridge."

Sam worked in behalf of good roads in that section of the state until the World War, when he served the Navy in shipbuilding projects, chiefly at Galveston, Texas. After the War, he returned to his Oregon home and plunged again into his road-building activities and other public services. He was for many years chairman of the Tillamook County Republican central committee and served on various

state commissions. A few years ago he gave the state 166 acres of right of way and 500 acres of beautiful coast and mountain land for a park, in order that the region might be kept intact for posterity. I wish space would permit the quotation of several really moving editorials from Oregon papers expressing their opinions of Sam Reed's personality and generous public service. One, entitled "Sam Reed, Road Builder," closes with these sentences: "The sheep that wander on the mountain have been Sam's sheep, and the very mention of the word Neahkahnie will always call to mind the kindly countenance, the helping hand and the generous courtesy that was his. The bridge that bears his name will keep his memory green for future generations. . . . But Sam and Neahkahnie are one to us, and wherever we see cars whiz by on Tillamook county's good roads, we remember that without the mind and hand of Sam G. Reed, these things might not yet be." I received a beautiful letter from Mrs. Reed a few weeks ago, to which a reply was sent expressing the sense of loss and the deep sympathy of the Class for her and her three married daughters.

Warren Jenney died of a heart attack at his home in Weston, Mass., on October 18. For many years he had been a devoted member of the Class and was greatly interested in matters relating to M.I.T. Jenney was born in South Boston, September 11, 1871, son of the late Noah and Mary Howes Jenney. He left the Institute after two years and entered the employ of the Anaconda Copper Mining Company as an engineer. He served this company for more than fifteen years. Returning to Massachusetts, he established a home in Weston, where he lived for twenty-five years. He was in the insurance business for many years and was more recently connected with an investment trust. An ardent Unitarian, he was a member of the First Parish Church, Weston, and an usher at King's Chapel, Boston. He is survived by his wife, three sons, and three daughters. The Secretary attended Warren's funeral as a friend and the class representative. — SAMUEL C. PRESCOTT, *Secretary*, Room 3-207, M.I.T., Cambridge, Mass.

## 1895

Archer Estes Wheeler, III, is one of our mining lads who has strictly followed his profession in a most remarkable way. Wheeler's activities have taken him to many countries and many climes. During the compiling of our twenty-fifth anniversary book, Wheeler was so far away that he did not supply the required photograph, so it is difficult for some of us to know how gray or how bald he may be by this time. We hear through the press, however, that Wheeler, a copper expert, was made an honorary member of the Electrochemical Society, Inc., at its eightieth annual convention, in Chicago on October 3.

We quote from *Mining and Metallurgy* of November: "... The illumined parchment scroll of honorary membership in the society was presented to Mr.



1895 Continued

Wheeler. He acquired his fundamental engineering training at . . . Technology. His first position was with the Boston & Montana Consolidated Copper and Silver Mining Company, at Great Falls, Montana, where he was successively promoted from mechanical draftsman to chief engineer and superintendent. In 1914 Mr. Wheeler became consulting engineer of the Union Minière du Haut Katanga which owns one of the most extensive copper deposits in the world. He has directed the design and installation of electrolytic copper refineries. . . . The world-wide development of copper metallurgy during the last 25 years, owes much to Mr. Wheeler's genius and untiring efforts."

When you visit Santa Barbara, Calif., you will still find Allan P. Brown, but at a new address: Hotel Normandy, 27 East Victoria Street. Watson E. Goodyear is still in Connecticut, now at 143 Hoadley Street, Naugatuck.

We regretfully report the death of Lawrence Barr, VI, on November 13. Cutter learned through a letter from Jeanne H. Prior, Lawrence's daughter, that her father had passed away. Barr had been in poor health for a number of years and spent most of his time among the pines of Pinehurst, N.C., where he had built himself a fine home.

When he left Technology, Barr entered the employ of the American Bell Telephone Company. Shortly thereafter he accepted a position with the Central District and Printing Telegraph of Pittsburgh, Pa. From 1899 to 1902 he was chief engineer of this company, but he resigned to do expert telephone work in Mexico City. Following his Mexico experience he left engineering and entered business to manufacture Larkin's metallic packing for piston rods of steam engines, air compressors, pumps, and so on. He was also vice-president of the Gray-Barr Company of Elyria, Ohio, makers of hosiery.

Barr visited Mexico several times, traveled through the western states, Honolulu, Japan, and China — including a trip to Peiping and the Great Wall of China. In 1910, he visited Switzerland, Germany, Austria, Italy, France, and England. In 1913, he resided for a time in Los Angeles, Calif. Barr was unable to attend reunions because he was generally traveling in some far distant clime, but he did manage to attend, with Mrs. Barr, the class reunion in New York in 1939.

Your Secretary expresses the hope that many of our fellows have come through 1941 with their chins up, and that they may be able to face 1942 with courage and a determination to strive for better days. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

## 1896

Henry Jackson reports that the movies of our reunion last June have now been assembled, and they form a reel of about 150 feet of 16-millimeter film. Some of the shots were duplicates, so that the reel is not so long as had been anticipated and does not equal the reel of 1936. The new reel now has to be titled and will then

be available for any member of the Class who desires to borrow it from the Secretary.

Last month we announced that mail sent to Pierre Richards in France six months or more ago had finally been returned with the notation "Service Suspended." A search for Richards by the Secretary disclosed that he has returned to America and his address for some time has been Hemlock Road, Short Hills, N.J.

Ed Barker reports that he is in a situation somewhat similar to that of your Secretary, in that, although he has been retired and has the title of professor emeritus, he nevertheless keeps his office in the Lowell Textile Institute in Lowell, Mass., and seems to be just as busy as ever.

For the past few years Charlie and Bertha Tucker, after the apples are picked and the crops harvested from their farm on Mill Road in North Andover, Mass., have started off on an ocean voyage. This year they ventured a little farther afield than in the past, as was evidenced by a post card which they sent from Savannah, Ga. The Secretary had the pleasure of another visit to the Tucker farm on November 9. This year, instead of sweet cider for dinner, we had a special brand of drink which looked like tomato juice and which actually was based on tomato juice, but to which Mrs. Tucker had added other fruit and vegetable juices to enhance its flavor about 500 per cent. (Recipe furnished upon written request to the Secretary.)

On November 13, your Secretary, in his capacity as Alumni Secretary, attended a dinner meeting of the Technology Club of New Hampshire at the Eagle Hotel in Concord. Sam Hunt was right on deck as usual. He said that during the past summer he had spent considerable time at a camp in the Adirondacks and had enjoyed tramping and mountain climbing. He hasn't any fixed job at the present time and thus is free to get away for travel. He is highly esteemed in his home community of Manchester, N.H., where he may be designated as the general-expert, civic chore-boy of the community. He is called upon whenever his wide knowledge and sane judgment can find application to problems involving professional, civic, and financial matters, both public and private.

When Rockwell returned from his trip to Tennessee in the fall, he tried to see Stanley Howland in Asheville, N.C., but without success. When he stopped over in Williamsburg, Va., however, he had the unexpected good fortune to run across William C. Ewing, who was associated with our Class in much of the work that he took at M.I.T. but who is officially a '97 man. Ewing got into the architectural line and had a lot to do with the restoration of old-time Williamsburg. When that job was completed, the place looked so attractive to him that he decided to retire, but retirement for him did not mean idleness. Consequently, he established himself in one of the oldest of the original Williamsburg stores and is a purveyor of curios, cards, and many other things

which are attractive to the tourists visiting Williamsburg.

A rumor is going around to the effect that Ralph Henry is beaming these days because of the arrival of a grandson. Efforts to have this rumor confirmed by Ralph, and to secure further details, have so far been unsuccessful. It is suspected that Ralph's daughter Elizabeth, whose married name is now Kirshberg, was the agency that put Ralph in the grandfather class.

The Secretary had the unexpected pleasure of a call from Helen Chamberlain Dodd on November 19. Years had elapsed since we last met. She regretted very much that her husband's illness prevented her from being with us in Osterville last June. Her husband, who was Walter S. Dodd '88, had been ill for some months and passed away from a heart attack on October 26. The Twin Flower Farm had been left more or less unattended, and the Dodds had devoted more of their energies to their summer tearoom. Just at present Helen expects to plunge into a resumption of her civic work and defense activities.

Lloyd Wayne now seems to be holed in for the winter in Indianapolis, according to his report of November 23. He had the sad news that his brother, who had been ill in Florida for a few months, passed away on September 3 in his eighty-second year. When Wayne returned to Indianapolis from Florida, he made weekly trips to Barber Lakes in northern Indiana, a quiet spot which proved to be very restful. When he checked up in October, he found he had driven about 12,000 miles since May 1, and decided that he was fed up with automobiling and was ready to sit by his home fireside. He saw Joe Stickney on the street one day, and they had a brief chat. Joe was suffering at that time with some temporary muscular maladjustment of his legs.

A letter from Henry Waterman tells that he is now entirely recovered from his serious illness of last year and is just as busy, or even busier, than ever. He recently carried on a campaign for reelection as a Liberal candidate to the provincial legislature of Nova Scotia, and he was swept into office along with other Liberal candidates. Henry's popularity is evidenced by his vote of 4,441 over that of his Conservative opponent, with 2,636.

John Lonson Coley passed away on March 26, and Edward Bertelle Gordon, Jr., died on September 13. Both received their degrees of S.B. in mechanical engineering with our Class, but neither had participated in class affairs. Coley was born on October 3, 1869, in Westport, Conn., and all of his life was apparently passed in that city, although no information has ever been received regarding his occupation.

Gordon was born on February 15, 1874, the son of E. B. Gordon of Lynn, Mass. The only information ever received about our classmate was that he became associated with the Pillsbury Engineering Company of Minneapolis, Minn., and in recent years had become president of that organization.

1896 Continued

By the end of November, all classmates should have received a copy of President Compton's annual report and also a copy of the first annual report on the M.I.T. Alumni Fund. President Compton's report is commended to everyone as a publication which should be read thoroughly from beginning to end, as it tells the story of how Technology has responded to the special calls that are coming to it today. The first report on the Alumni Fund is likewise something that everyone should read. Attention is called here to the showing made by our Class. This showing is good from the point of view of the percentage of classmates who have contributed, being among a small group of classes which have exceeded 30 per cent. Total contributions of our Class, however, are not quite so satisfactory, although they do not look too bad by comparison with some other classes of our time. The average contribution per person seems to stand out rather poorly, being less than \$10.00, whereas other classes of our time, with very few exceptions, have shown average contributions ranging upward from \$10.00.

Our Class has always had a record for united effort, each member doing what he could and not depending upon two or three of the fellows of greater financial means to bolster us up. The question is whether every member has asked himself whether he really was giving what he could. Has he considered that it costs \$5.00 to subscribe to *The Review* and to carry on expenses of the Alumni Association and the Alumni Fund, so that only the amount by which his contribution exceeds \$5.00 really benefits M.I.T.? An encouraging sign is that our showing at the moment is better than it was a year ago at this time. We appeal to those who have not yet sent in their contributions to the Alumni Fund to give the matter their early attention, and to those who have made a contribution this year to give the matter further consideration to see whether they may not feel the urge to increase the amount they gave, in order to gain a better showing for the Class. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

## 1897

George S. Lawler, VI, of Marblehead, Mass., died on October 31 at the age of sixty-seven. For many years George had been an electrical engineer with the Associated Factory Mutual Fire Insurance Companies of Boston. He was a native of Boston and was well known as a lecturer and author on technical subjects. He was a member of the American Institute of Electrical Engineers, International Association of Electrical Inspectors, National Fire Protection Association, and the Winthrop Lodge of Masons. He leaves a widow, two sons, and a sister. His quiet and very likable personality will be remembered by classmates.

A. H. Pugh, X, President and Treasurer of the A. H. Pugh Printing Company of Cincinnati, Ohio, recently sent your

Secretary a page from a monthly magazine issued by the ordnance office in Cincinnati. Harry is a colonel in the Ordnance Department Reserve, and the page in question carried an article written by him on the present status of the chlorine industry as affected by defense demands. Chlorine is greatly needed for defense purposes, and already a reduction of 10 per cent had been made in the amount available for civilian uses.

One of the first industries to feel the effect of this reduction is papermaking. In the future we must be prepared to have considerably less white paper. Harry states that a large amount of chlorine will shortly be released for defense purposes when a plant for the manufacture of hydrochloric acid is completed. This acid will be substituted for the chlorine now used in the making of tetraethyl lead. At the top of the article was a fine picture of Harry in his uniform. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

## 1898

Two or three years ago, after he had been retired from business about ten years, George Cottle became interested in a small factory in South Easton, Mass. The factory, which makes gears, had been struggling along for years, just breaking even. George has been working sixteen hours a day and now has the factory running on an extremely profitable basis, with all the work it can handle. He plans to take a two-month vacation beginning on January 1. He may motor with his sisters to the Gulf states and California, fly to Mexico City and other points of interest, and then fly back home.

Your Secretary has retired from active teaching, but, as professor emeritus, retains an office and research laboratory at Technology. He started on December 1 for a two-month trip by auto to the South Atlantic states and Florida. His schedule includes several speaking engagements at local sections of the American Chemical Society.

George H. Wright died on October 18 at his home in Brookline, Mass. George was a prominent Boston dentist and was noted for his achievements in the theory of dental surgery. He taught for many years at the Harvard Medical and Dental schools.

Mabel Clapp Lord, XII, died on July 11. Mrs. Lord was active in alumnae affairs. Her husband, Dr. Frederick T. Lord, died on November 5. He was a professor emeritus at the Harvard Medical School and was internationally known as a pioneer in the serum treatment of pneumonia and for his study of the social aspects of medicine.

William McKell, III, died on August 24, 1939. He was general manager of the Kanawha, Glen Jean, and Eastern Railroad at Glen Jean, W. Va. — ARTHUR A. BLANCHARD, *Secretary*, Room 6-421, M.I.T., Cambridge, Mass.

## 1899

On May 10, South Portland, Maine, gave a celebration in honor of William S.

Newell's construction of destroyers for Uncle Sam and merchantmen for Great Britain.

On October 30, in this same city of South Portland, eight thousand people assembled at the new Todd-Bath Shipyard at Cushing's Point, which ten months ago was nothing but an acreage of tidal flats and waste land, to hear Wallace H. White, Jr., United States Senator from Auburn, declare that this nation would "not permit Hitler to drive our ships from the seas." Forty-six cargo carriers are under construction at this yard — thirty for Great Britain and sixteen for the United States. Ranking officials from the United States, Great Britain, and Canada joined in the demonstration of the workmen, who laid down their tools to cheer for Newell and the work he has done for both countries.

From a classmate I heard that in May the New York chapter of the New Bedford Textile School Alumni Association voted to establish a scholarship fund for a worthy student attending the school. This will be called the Everett H. Hinckley Memorial Scholarship. Hinckley was responsible for the development of the chemistry, dyeing, and finishing department of the New Bedford Textile School. The funds will be raised for this scholarship by contributions from individual members and from the chapter treasury.

In June, I drove through New Hampshire and called on Norman Seavey at Dover, where I found him running one of the finest hardware stores that I have ever seen. The display and the merchandise were excellent. The store has been in Seavey's family for several generations. My visit with Norman was short but very pleasant. — On this same trip I enjoyed a visit with Arthur Little Hamilton at Sugar Hill, N.H.

D. C. Churchill, E. A. Packard, and C. B. Cluff reported visits to Washington during the past year. Unfortunately, I did not see any of them. I am still looking forward to the time when their visits, and those of others, coincide with my presence in Washington. I have also heard from Gardner Barry, Arthur Hamilton, and Miles Sherrill. I would appreciate notes from more of you.

Tim Kinsman was elected a member of the Visiting Committee on the Department of Economics and Social Sciences. Miles Sherrill was elected vice-president of the M.I.T. chapter of Sigma Xi for 1941 to 1943.

It is with extreme regret that I announce the deaths of the following classmates: Harry W. Goldthwaite, Harrisburg, Pa., on May 8; Timothy W. Hoxie, Flushing, Long Island, N.Y., on May 10; James Ford Clapp, Boston, Mass., June 3; Hope W. Narey, Brookline, Mass., September 28; and Lewis Emery, Bradford, Pa., November 8.

In the next issue I shall pass on a list of the address changes that have been accumulating. — W. MALCOLM CORSE, *Secretary*, 2029 Connecticut Avenue, Northwest, Washington, D.C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.



## 1900

At the October meeting of the Alumni Council, the regulars, Russell, Fitch, Allen, Ziegler, and the Secretary, were all present. Stearns and Neall were guests.

Bugbee has returned to this vicinity, and we hope to publish a letter from him telling of his travels. Edward G. Gallagher was present at the September meeting of the Technology Club of the Connecticut Valley held at West Springfield, and last June Mr. and Mrs. Charles H. Stratton attended a picnic held by the Washington Society of the M.I.T. on the estate of Allen B. McDaniel '01 at Waterford, Va.

We are obliged to Dennie '11 for sending in a picture of Fred Everett which appeared in the Boston *Post* on October 29. Fred was one of the speakers at the autumn meeting of the New England Road Builders Association at the Hotel Copley-Plaza. — Once again the Boston *Herald* published a likeness of Jim Patch, this time with Mrs. Patch at the ladies' night, November 3, of the Baptist Social Union at the City Club. — Jim Batcheller called about the middle of November and reported that he had been laid up with a serious illness but felt that he was well on the way to recovery. Philip B. Cooper has moved to 603 Wyndhurst Avenue, Roland Park, Baltimore, Md. — Nat Rand, whose hobby of covered bridges was mentioned in the December issue, wrote as follows: "Many thanks for sending me the New York *Times* book review describing Congdon's book on the old covered bridges of Vermont. I am sending for it. In my collection I have less than a dozen photographs of Vermont's bridges. Should I ever get to Boston, it will be my pleasure to look you up and take time out to reminisce." — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

## 1901

In a postscript to a recent letter, our esteemed Class President, Robert Williams, wrote: "I certainly was very much surprised to receive the beautiful watch from the Class; so much so, I am afraid I did not half thank you at our dinner. The watch keeps perfect time, and I have worn it every day."

We have at hand a clipping from a Boston newspaper which mentions two M.I.T. men and a number of other prominent men who are summer residents of Duxbury, Mass., or are retired and make their home there. The two M.I.T. men are William F. Clapp and our classmate, Charles Bittinger.

Dr. Clapp is a lecturer in marine economics at M.I.T. He is a nationally known expert on sea termites, the shipworms of the Greeks.

Charles Bittinger was trained at both M.I.T. and the École des Beaux Arts in Paris, and has done both scientific and artistic work. During the World War he served in the camouflage section of the Navy as a lieutenant commander, and in 1937 was a member of the National Geographic expedition to Canton Island

to study the eclipse of the sun. He has also exhibited paintings in Paris, New York, Philadelphia, and Washington, and won medals at St. Louis and San Francisco and prizes elsewhere. He has paintings in the Metropolitan Museum of Art in New York and in other collections. At present, he is a lieutenant commander in the Navy and is stationed in Washington at the Naval Research Laboratory.

Bittinger has owned and occupied the old Moore place in Duxbury for many summers. The house is an old, brick, square-rigger type and stands almost across the street from the house where your Secretary was born. The original owner, Mr. Moore, was minister of the Unitarian church for over fifty years in the last century. The church was founded by Elder William Brewster, a direct ancestor of your Secretary on the maternal side.

We regretfully report the death of our classmate, Julius E. Ober in April. He was retired and resided in Brookline, Mass.

We were glad to learn a little about his work from Norman Dubois, who attended the reunion. He is now located in the town hall, Brookline, Mass., and is chemist and assistant to the agent of milk and food inspection, fuel analyst, supervisor of sanitary inspections and control, sealer of weights and measures, and quarantine officer. His residence is at 1200 Great Plain Avenue, Needham, Mass. — GUY C. PETERSON, *Secretary*, 788 Riverside Drive, New York, N. Y. THEODORE H. TAFT, *Assistant Secretary*, Room 3-266, M.I.T., Cambridge, Mass.

## 1904

We sincerely hope that you all enjoyed the holiday season. — From Selskar Gunn I received the following letter, dated November 5, on the stationery of the National Health Council, 1790 Broadway, New York City: "I came back to the United States in June, 1940, after having been forced to close our Paris office. I shall be on this new assignment for three years and shall probably have to travel over the entire country. This arrangement will, of course, take me to Boston, and I hope I shall have a chance to see you. The enclosed clipping from the New York *Herald Tribune* of October 15 may interest you."

"Dr. Kendall Emerson, president of the National Health Council, . . . announced . . . that the Rockefeller Foundation had made a grant of \$75,000 to the council to make a comprehensive study of the activities of private health agencies in the United States. . . . The study will be directed by Selskar M. Gunn, vice-president of the Rockefeller Foundation, formerly in charge of its program of rural reconstruction in China, and more recently director of its European headquarters in Paris.

"For many years Gunn has been battling plagues, malnutrition and their attendant physical ills as European director of the Rockefeller Foundation. The foundation gives him a leave of absence to catch up with his home work. He was born in London in 1883, came here at the

age of 17, was graduated from . . . Technology, later from the Harvard School of Public Health, and made a distinguished career in highly specialized health education. During World War I he joined a scientific expedition to France to wage war against tuberculosis."

Joseph W. Crowell died at his home in Waterloo, N.H., on June 5. We all remember the Joe of undergraduate days as a sprinter on the track team and an enthusiast on the Stanley steam automobiles. After graduation, he was interested in the Highland Grain Mills at Newton Highlands, and he conducted a flourishing garage on the site now occupied by the Newton City Hall. In later years, he was interested in real estate developments on Cape Cod. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, Apartment 202, 3024 Tilden Street, Northwest, Washington, D. C.

## 1905

Your Secretary ran across Arthur P. Gerry, II, at the Belknap Mountains recreational area in Laconia, N.H., where Arthur has been general manager for nearly a year. This work has brought him out of his retirement of the past few years into a semicommercial life, which he seems to enjoy thoroughly. He wants any classmates who like winter sports to look him up.

Our ever alert Assistant Secretary, Fisher, reports that Grandpa Prince Crowell of Woods Hole and Franklin, Mass., is actually the best class skipper. Prince was the star attraction at a meeting of the men's club of the First Church in Roxbury recently. (Andy served one of his famous quahog chowders.) Prince had proof that in the Cape Cod championships of last summer he was not merely ballast. One picture he had showed him with his hand on the jib sheet.

A. L. Smith, V, is flying high these days. He is very busy at General Electric, Nela Park, East Cleveland, Ohio, but he flew to have Thanksgiving with his fine young son, Manning '40, one of Doc Lewis' star pupils, now teaching at Bowdoin College.

I ran into Henry H. W. Keith, XIV, at the Institute recently and found him as idle as an Office of Production Management consultant could be and as loquacious about that part of his job as a clam. He did say that Clayton M. Simmers, XIII-A, a captain in the Navy, had been transferred from Boston to the New York area on some special errand. — George B. Hardy, III, has moved from Long Beach, Calif., to Los Angeles. His new address is Santa Rosa Hotel, 343 South San Pedro Street. Should our Pacific Coast Secretary find him on location, I hope he gets the story.

George B. Jones, II, notified us of the death in Chicago on November 4 of Adolph J. Ortseifen, who since graduation had lived in Chicago, where his father was city treasurer for several years. During the World War, Adolph was a captain in the Quartermaster Corps. He was president of the Ortseifen-Britten

1905 Continued

Contracting Company. He leaves a widow and a son. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 137 Newbury Street, Boston, Mass.

## 1906

The Boston *Globe* of Sunday, May 11, contained a long illustrated article under the heading, "Mushing One Thousand Miles a Winter Just Routine to Woman Doctor." This is a very interesting account of the work of Helen R. Hosmer, who at that time was leaving for another four-year period of duty in the Grenfell Mission Hospital on the northeastern coast of Labrador. Her work consists of traveling by dog sled and motorboat. The motorboat is for summer use, and the doctor acts as both pilot and engineer. As the only man in that part of the country who knew anything about gasoline engines is now in the British Navy, on a recent visit home Dr. Hosmer had to add the study of these devices to her twenty years of medical experience, her two years of psychological research, and her earlier profession of chemistry. Her work is a combination of doctoring, consulting on dietetics, agricultural advising, and, in general, being a good angel to the inhabitants of that part of the world.

The Tucson, Ariz., *Citizen* of April 26 printed an account of the investigation by an engineering party of the Santa Fe Railway to check the mineral resources of Arizona, with particular reference to the availability of strategic minerals. Carroll E. Miller, XIII, was acting as assistant director of the mineral resources department for the state and worked with the investigators. The following extract is from the paper: "He is a graduate of . . . Technology which he entered after resigning from the United States Naval Academy to take up the study of mining. He is an outstanding industrial mining engineer and has operated some of the larger mines in this country and has traveled throughout North America. During the World War he served as an officer in the United States Navy and in the course of duty has studied development of natural resources in European countries with the object of peacetime development possibilities."

In the November issue of *The Review* I mentioned the engagement of Henry Ginsburg's daughter to Neil Dushan of Dorchester. The marriage took place in Brookline, Mass., on Sunday, November 23. — JAMES W. KIDDER, *Secretary*, Room 802, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

## 1907

Benjamin Franklin Mills, I, died in Washington, D.C., on November 4 from an illness contracted during his long residence in the Philippine Islands, where he had lived from 1908 until December of 1940. Ben received his A.B. degree from Williams College in 1905, when he was valedictorian of his class, and was a member of Phi Beta Kappa and Phi

Gamma Delta. He was graduated from the Institute with our Class and was with Penn Steel Company for one year, then went to the Philippines as a civil engineer with the government there, building bridges and public buildings. He maintained this connection until 1920, and then, until 1939, conducted a private practice as a consulting engineer. From 1939 until his return to the United States, because of failing health, in the winter of 1940, he was engineer in the construction division, United States High Commissioner's Office, Manila. He lived at San Juan, Rizal. Ben was married twice and had five children by his first wife, who died in 1932. The children survive him, as does his second wife, to whom I wrote a note of sympathy on behalf of the Class. Two daughters and one son now live in Manila, while one daughter is in Great Barrington, Mass., and one son is a student at the Montana School of Mines.

Jim Barker thoughtfully sent me clippings from New York papers regarding Ben's death and commented: "I knew Ben in Pittsfield, Mass., when we were boys together in high school. I am, of course, jolted by his death. He had a brilliant mind. . . ."

It was good to receive a cordial note from Cecil F. Baker early in November, as the result of my letter to him. He writes that for a while in the early Thirties he was out of work, then from 1932 to 1934 was with the Century of Progress as chief of operators' section, buildings and grounds division. From 1935 to 1938 he was regional architect with the National Park Service located at Omaha, Neb., and since then was in the Quartermaster Corps of the United States War Department for two years at Chanute Field, Rantoul, Ill. Since 1940 he has been architect with the zone constructing quartermaster of Zone V at Columbus, Ohio. Cecil has two sons, aged seventeen and eighteen. His address is 1178 Virginia Avenue, Columbus, Ohio.

Sam Coupal, who is director of the Department of Mineral Resources of the state of Arizona, with office at 518 Title and Trust Building, Phoenix, wrote to Harold Wonson on November 15 that he had a pleasant visit with Larry Hampton, an '07 miner, in Los Angeles last spring, and also with Carl Trauerman at the convention of the American Mining Congress in San Francisco in October. — Milton MacGregor tells us that his son Arthur, who has a research job with the New Hampshire Fish and Game Commission, became the father of a son, Douglas Charles MacGregor, on November 6. — Henry D. Loring writes: "I am still where I landed when Pop Swain blew me out here in 1907. In thirty-four years I have made a meteoric rise from blue-print boy to chief engineer and a vice-president." Henry is with the Ferro Concrete Construction Company, Cincinnati, Ohio. He has two sons, Albert D.'34, and Samuel J.'36. Henry's home address is 1278 Michigan Avenue, Cincinnati.

On June 5 to 8, only five months from the time you read this, our thirty-five-

year reunion will take place at Oyster Harbors Club. I have never known any man who attended one of our five-year reunions to fail to have a good time, but I have known of many '07 men who *have* failed to have a mighty fine time because they have *not* attended one of these gatherings. Don't deprive yourself of the good time awaiting you next June. Adopt for yourself the slogan, "I must plan to go."

The leading article in *This Week* magazine of November 23 is entitled, "A Yank Bosses Canada's War Effort," and has the subheading, "Canada, starting almost from scratch, has become a world-important arsenal. Behind this great feat is Massachusetts-born C. D. Howe, her industrial czar — a man all America can be proud of." Thus our Clarence once more makes the news in a big way. The reporter who wrote the article says: "I had been interviewing the big boss of all Canada's big bosses. C. D. Howe is the name — the Honourable C. D. Howe, to give him his full due according to Canadian custom and spelling. As Minister of Munitions and Supply, he is the Beaverbrook of Canada. His powers over industry are almost unlimited. He can tell any Canadian manufacturer what to produce, how much, to whom to sell it, and what he may get for it. No one man in our American defense setup has any such accumulation of arbitrary powers. Potentially the man is a dictator, no less. But the interview had not measured up to that billing. The minister didn't look like a dictator, act like a dictator, or talk like a dictator. A ruddy-faced man in a rather rumpled gray business suit, he sat behind his none-too-tidy desk and talked in the low monotone of a business man reading an annual report. And what he said was just about as impersonal and unemotional as an annual report."

The reporter refers to Clarence as "the man who in a year's time engineered and directed 'the most rapid and greatest industrial expansion that Canada has ever known.'" He quotes a prominent Canadian as having said to him, "Maybe somebody else could have organized this show as well as C. D. Howe did, but I don't know who it would have been. In the past I've disagreed with him politically more often than not. But when it comes to organizing a production machine, I'll hand it to him." — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

The first get-together dinner and meeting of the season was held at Walker Memorial on Tuesday, November 18. The following classmates were present: George Belcher, Bill Booth, Nick Carter, Cookie, Harold Gurney, Sam Hatch, Winch Heath, Doc Leslie, Steve Lyon, Linc Mayo, Henry Sewall, and Joe Wattles. Several of the regular attendants — Fred Cole, Paul Esten, George Freethy, Pop Gerrish, Matt Porosky, and Frank Towle — couldn't make it because of previous engagements. — Myron Davis



1908 Continued

reported that he was leaving that day to spend a few days with Harry Bentley in Washington, D.C.

Following the dinner, Joe Wattles and Harold Gurney showed some very fine Kodachrome stills taken in various parts of the country. Some of Gurney's pictures were taken with a telescopic lens, and the resulting pictures, especially at Grand Canyon and Mount Washington, were very beautiful. Joe Wattles brought in some of his prize-winning black and white enlargements of 35-millimeter film. — We decided to have another dinner meeting on January 20, probably at the University Club in Boston. The usual notices will be sent out; make your plans now to attend.

We are very sorry to report the sudden death of William A. Adams in Shanghai on November 14. Since leaving Technology, Bill had spent most of his life in Shanghai, where he was president of the China Realty Company. He was also president of several other trading and textile manufacturing concerns. He was in Boston last July on one of his rare trips to the United States. The sympathy of the Class is extended to Mrs. Adams and the family.

John Locke, Vice-President of the General Steel Castings Corporation, Eddystone, Pa., wrote as follows: "This year my son is a senior at Cornell, where he is a member of the Delta Upsilon Fraternity. Mrs. Locke and I try to visit Ithaca a couple of times a year to see if he is still there. During our semi-annual visit last spring, another lad came into the room. He was Kurt Vonnegut, the son of our classmate! Kurt, Jr., is a sophomore and is also living at the Delta Upsilon house. As the result of our conversation, I learned that Brother Kurt is well and is still functioning as an architect in Indianapolis. Although I have not seen him since way back in '08, I could still remember him clearly enough to detect a resemblance between father and son." — Several sons of '08 are at the Institute this year. Walter Caldwell, Nick Carter, Harold Gurney, and Joe Pope all have boys in '44 or '45.

Congratulations go to Gregory Dexter for his illuminating letter in the Mail Returns column of the November Review. — Harold Osborne of the American Telephone and Telegraph Company, New York City, is Vice-Chairman of the American Standards Council. — Ted Joy, engineer for the town of Milton, Mass., is a director of the Boston Society of Civil Engineers.

The Pittsburg-National Meters Company, of which our William F. Rockwell is president, held an open house at the Hotel Statler in Boston to celebrate the opening of their new offices at 708 Beacon Street. The following account is taken from the Boston *Globe*: "One of the most interesting innovations in the new offices . . . is a museum library where reference material, literature and periodicals relating to water plants, oil refineries, industrial and power plants are, for the first time, made readily available to waterworks and industrial engineers.

"Pittsburg-National Meters is the combination of two of the country's oldest meter companies, Pittsburg Equitable Meter Company and National Meter Company, which merged in March of this year, becoming the world's largest organization in the meter field. . . .

"Col. Rockwell said in part: 'The importance of high efficiency in water works operations is doubly necessary in an emergency, such as exists at the present time. An abundant supply of pure water is the first essential in any civilized community. Much thought should be spent to prevent the waste of water. In the national defense program the conservation of water power and the minimum use of such water treatment chemicals as chlorine are of vital importance. . . .

"Col. Rockwell, now a resident of Pittsburg, was born in Boston, receiving his education at Mechanic Arts High School and . . . Technology." Rockwell is chairman of the board of the Timken-Detroit Axle Company and the Standard Steel Spring Company.

The following changes of address have been reported: Clarence W. Clark, 9444 Monticello Avenue, Evanston, Ill.; Henry W. Dun, 15 East 56th Street, Kansas City, Mo.; Hubert W. Flaherty, 124 DeLancey Drive, Geneva, N.Y.; Charles A. Gibbons, Jr., 1619 22d Avenue, Longview, Wash.; Aaron R. Merritt, 640 Main Street, East Aurora, N.Y.; Charles W. Morrison, Apartment 9H, 77 Park Avenue, New York, N.Y.; Walter G. Pfeil, 142 Ascension Street, Passaic, N.J. — Don't forget the dinner on January 20. — H. LESTON CARTER, *Secretary*, 60 Battery-march, Boston, Mass.

## 1909

Congratulations go to Herbert S. Howard, who has been advanced to the rank of rear admiral. Howard's new address is Bureau of Ships, Navy Yard, Washington, D.C. — Charles Hibbard, a lieutenant commander, is now stationed at the Willamette Iron and Steel Corporation, Portland, Ore. — Edward P. Chapman, a mining geologist formerly of Leadville, Colo., is now connected with the mining section of the Reconstruction Finance Corporation, Washington, D.C.

Your Secretary's older son, Charles T. Main, 2d, was married to Marjorie H. Dutch of Winchester, Mass., on October 29. — The M.I.T. Advisory Council on Athletics will be pleased to have contributions from members of our Class toward the estimated \$800 to \$1,000 needed for this year's activities.

The following interesting letter has just been received from Paul Wiswall: "When I was in Manila in 1920, I met Albert C. Buell. He and his wife were very kind to me. One day they invited me to go on a picnic, to which they also invited the Japanese consul general and his wife, who was an American girl. We went to some caves near Sibul Springs and then visited the bathing establishment and enjoyed the mineral water baths.

"It proved to be a delightful day for me. The five of us got on very well. We discussed only general subjects, for even

then the migration of Japanese was causing some talk. — The caves were decidedly interesting, since I had never seen stalactites before. I enjoyed myself so much that I made up two booklets of the snapshots I had taken, one for the Buells and one for the consul general and his charming wife. . . .

"I later heard that the consul general was stationed on the west coast of South America. That was the last I heard of him until I read in the papers a year or so ago about the signing of the pact between Germany and Japan. The signatory was our picnic companion, and now his name is on the front pages of all our newspapers. For he is none other than Saburo Kurusu! Judging by the newspaper pictures, he has put on about forty pounds since I saw him."

It has just come to my attention that in the first annual report of the M.I.T. Alumni Fund, the name of John W. Nickerson was inadvertently omitted from the list of classmates who have bought insurance for the benefit of the 1909 Scholarship Fund. I am much concerned over this omission, for I want John to get credit for his generous contribution to this special fund. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

## 1910

In October, your Secretary made one of his frequent trips to Williamsburg, Va. — William Nichols is now a colonel at the General Staff Corps headquarters, Fourth Corps Area, Atlanta, Ga. — Ernest Patch is a captain in the Construction Corps of the Navy. — In November, Henry Hale, who is a colonel in the Reserve Corps, had completed a month's active duty with the 26th Division in their strenuous war maneuvers in North Carolina.

Walter Spalding is now a lieutenant commander at the First Naval District headquarters in Boston. He is in charge of the work for the new ammunition depot at Hingham, Mass. — J. Theodore Whitney is a major in the Reserve Corps and has been assigned to active duty in Washington, D.C.

The following news is from the Denver, Colo., *Post* of July 28: "Edwin K. Jenckes of 1215 Corona Street, a metallurgical chemist and expert on the treatment of tungsten and vanadium ores, has gone to Washington to take a position as deputy chief of the minerals production section of the office of production management. . . . Jenckes, a graduate of . . . Technology, had been living here since . . . last Spring. . . ."

The Miami, Fla., *Herald* recently published a picture of a very fine house in Coral Gables. The house was built by George Batcheller, who is president of the Batcheller Construction Company. — Early in October, Al Huckins celebrated his twenty-fifth wedding anniversary by taking a trip to Guatemala. — HERBERT S. CLEVERDON, *Secretary*, 46 Cornhill, Boston, Mass.

## 1911

Harrison D. Soule died at his home in Whitman, Mass., on November 4. With us only during our freshman year, he had never taken an active part in class affairs but was quite a figure in insurance circles. He left his wife, Vera H.; a daughter, Mrs. Paul Schroder of Boston; and two sons, Kenneth, a student at Colgate University, and Donald, a student at Thayer Academy.

Soule was president of the George D. Soule and Son, Inc., insurance agency and secretary-treasurer of the Whitman Mutual Federal Savings and Loan Association. For many years he was a member of the Massachusetts Co-operative Bank League and helped to create the League of New England Savings and Loan Associations. He also was treasurer of the Whitman Red Cross chapter, an official of the Whitman Visiting Nurse Association and the Rogers Home for Aged Women Association, as well as a charter member of the Whitman Kiwanis Club and a member of Puritan Lodge of the Masons.

Our annual "Seven Come Eleven" dinner was held at Walker Memorial on November 7. Twenty-two — two 11's — attended. Ted Van Tassel, X, graciously presided, for both Dennie and Jack were unable to be present — the latter being in Cleveland on a business trip, and the former being held in Worcester by the closing dinner of the annual Golden Rule Fund.

In sending me a splendid report of the affair, Ted said: "Without you and Jack it was hardly like our usual affair, and we all hope that in the future you both will be able to be present. After the usual good meal we had a talk-around, which started at 8:00 P.M. and didn't end until 10:10, which meant no bowling."

Two classmates — John R. Bowman, XI, and Edward R. Hall, II — were present for the first time in many years, while June Adkinson, V, repeated her appearance of a year ago and was most welcome. On both an alphabetical and a ladies-first basis, June led off in the talk-around and announced that she is now vice-president of the M.I.T. Women's Association. She gave an interesting description of gathering pollens in connection with her work in the allergy clinic at the Peter Bent Brigham Hospital.

Walter Allen, XIII, who is with the A. C. Lawrence Leather Company in Peabody, said his company is producing much leather for the Army Air Corps. He has one son in the Air Corps. While the son was at Augusta, two disorderly prisoners beat him up, kidnapped him, stole his truck, and threw him off twenty miles from camp.

John Bowman is now in the Massachusetts Public Works Department and is busy building bridges at both Camp Edwards and Fort Devens. His hobby is modern poetry. — Obie Clark, II, is supplying cement work for Westover Field in western Massachusetts and for local shipyards. Eighty per cent of his work at present is for defense, including making fence posts for the new lighter-

than-air base at South Weymouth. He reported that classmate Harold Hallett, VI, is now with the Navy at Hingham Depot and that Ernest Batty's daughter had married recently. — Marshall Comstock, VI, reported that conditions are about the same as usual at Wagner Electric Corporation.

George Cumings, VI, who is with the New England Telephone and Telegraph Company, said: "Hush; my work is a defense secret." Henry Dolliver, I, a valuation engineer with Jackson and Moreland, Boston, is busy doing appraisals all over the country and is one of Emmons Whitcomb's best customers. Henry has two daughters. — Tom Haines, II, of the Boston Edison Company, said he would be busy maintaining distribution of electricity if Hitler decides to do some bombing around Boston.

Ned Hall, an engineer for the Merrimac Hat Corporation in Amesbury, said his older daughter is at home and doing some radio work. His older son is at Norwich University, and his younger daughter is doing some voice training. Ned is back in the service with the new state guard. He is also vice-chairman of the local defense committee in Amesbury. — Charlie Hobson, X, of Wintermaster, Inc., Cambridge, says priorities are so severe that his business may have to close. Also, many of the men have left to work at the Navy Yard. Charlie has a son in the Signal Corps, who reports that the girls in South Carolina are very good looking.

Roger Loud, VI, now with power sales department of the Edison Electric Illuminating Company, Boston, has a son at Tech and a younger son in high school. He reported the death of Harrison Soule. — Charlie McManus, I, with the Massachusetts Department of Public Works, is busy at present putting in a new road from Douglas to East Douglas. The road is being constructed by the state with Federal money.

I know you'll all be delighted to hear that Mabel Herlihy's health has greatly improved. — Roy MacPherson, II, reported that his wife, Ina, is well again and that she had sold all her pups but one. Roy is a civilian consultant for the Coast Guard now, supplying boats and crews, appraising and assisting in operating several hundred boats on an appropriation less than that of the Boston Police Department. He is known as acting superintendent of intelligence. — Fat Merrill, I, reported that Ralph Doane, IV, died on November 6. Ralph started with us but eventually became a member of the class of '12, with which he was graduated. Fat announced he has sold out his Therminsul Corporation holdings and added that his brother is home now from Shanghai.

Morris Omansky, V, who has a daughter studying architecture at M.I.T., gave an interesting talk on his research work in rubber, particularly in synthetic rubber. He stated that crude rubber, when available, is better as well as cheaper, but the synthetics are better resisters of oil, solvents, and heat. Synthetic production, he believes, may soon reach 10 per cent

of our requirements, even though the cost is three or four times as great as for crude rubber. The present supply of crude in this country should last about nine months. A good potential supply is natural guayule shrub from Brazil, and Germany has been getting most of her supply from South America. Para rubber is of course the best for our uses, but we can get but 3 per cent of our requirements, even though crude rubber can be sold for eight and one-half cents a pound at a profit.

Walter Phillips, VI, a New England Telephone and Telegraph Company engineer, said all three of his boys have now left home and joined the Navy. One of them is at Hingham Depot. — Bog Stevens, IV, still with the Stone and Webster Engineering Corporation, has been busy of late on the design of a new large power plant to produce steam at 1,200 pounds pressure for St. Louis. His son is now two years old. — O. W. Stewart, I, reported one son in service in Virginia and another in architectural work on city planning.

Emmons Whitcomb, XI, gave an interesting talk regarding the proposed improvements to make Boston Airport the equal of any in the country and the hope for direct transcontinental and transatlantic airlines after the present emergency. He also stated that airlines are now devoting nearly 90 per cent of their capacity to national defense. He believes that future transatlantic flying will be by land planes rather than by flying boats. In addition to his farm, Emmons has a new hobby — meteorology, as in his business knowledge of the weather is useful as well as interesting.

Gordon Wilkes, II, Professor of Mechanical Engineering at M.I.T., has two married sons and is now a grandfather. He is doing quite a bit of defense work. On a Pennsylvania trip recently he saw Pete White, II, at Beaver Falls. — Aleck Yereance, XI, has sold his farm in Ashland and moved his family back to Cambridge. He has now completed fifteen years with the Prudential Insurance Company of America — seven of them in New England.

Chairman Ted closed the dinner program with a description of the production of alcohol for use in explosives and mentioned briefly possible economic means of minimizing the effect of the postwar adjustment, reducing unemployment then, and raising the general standard of living. He recommended land value taxation rather than the present method of levying taxes on improvements and everything else they can think of, regardless of its effect on business.

Harry Tisdale, V, attended the twenty-first annual meeting of the American Association of Textile Chemists and Colorists at Pinehurst, N.C., the early part of November. Harry was chairman of the New York section for the convention and proud of the fact that one of his section's papers was adjudged the prize paper. Sam Hayes, V, was general chairman of the meeting. He did a swell job, according to Harry. Sam is at present



## 1911 Continued

resident manager for the Ciba Company with offices at Charlotte, N.C. Harry said that Joe and Rose Harrington spent a week end with them in October, and that recently his wife, Grace, had made her first long auto trip since her bad accident, driving from Scarsdale, N.Y., to New London, Conn., and back.

In his first report as president of Northeastern University to members of the corporation, Carl Ell, XI, stressed the important work that institution is doing in national defense. — He pointed out three important things the colleges must strive to do: (1) develop a sound background of knowledge with respect to the fundamental bases of democracy and to the problems with which our country is faced; (2) arouse a sincere appreciation of the values which inhere in a democracy and in the democratic way of life; and (3) engineer a keen sense of duty and responsibility with respect to our country.

In closing his report he said: "The Northeastern man should be able not only to participate intelligently in the tasks that fall to his lot during the period of the national emergency, but should be able also to take his part later in the important period of reconstruction which must always follow a major conflict such as is now being waged." — Add to '11 grandfathers Hal Jenks, VI. Yessir, a card from Hal announced the birth on October 20 of Linda Ann Rauscher, 8 pounds, 1 ounce, to his daughter, Evelyn Ruth Rauscher. Congratulations to all concerned!

Ewazo Suzuki, X, president of the Taiyo Soda Company, Ltd., Tarumi, Hyogo-ken, Japan, is now president of the Kwansai Branch of the M.I.T. Association of Japan — Roy Seaton, II, dean of engineering at Kansas State Agricultural College, is now with the United States Office of Education at Washington, D.C. We have recent address changes for: Art Coupal, II, 30 Norwich Road, Needham; Art Leary, I, 44 Tennyson Street, West Roxbury, Mass.; Harold Lord, II, 17 Patriot's Drive, Lexington, Mass.; and Paul Pearson, II, 86 Pleasant Street, Concord, N.H.

I am indeed proud and pleased to see the way '11 stays up on top in the Alumni Fund records. At this post-Thanksgiving writing we have reached 99 per cent of our quota of contributors, which is based on one-third of the total membership of each Class.

From Jack and me go to all of you sincere good wishes for a happy and prosperous New Year. Don't forget that resolution to "Write to Denniel!" — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

## 1914

Bill Price is back in the East, and we look forward to seeing his genial smile at the New York gatherings again. In July, Bill became vice-president and general manager of Robert M. Green and Sons, Inc., of Philadelphia. The company

is one of the country's oldest soda-fountain manufacturers; in fact, the founder of the business is credited with the origination of the ice-cream soda.

Ed Wentz continues to keep in the fore as to the number of patents currently issued to '14 men. Another patent covering a sound-film recording or reproducing device has been granted him. When Warren Horton was with the Bell Telephone Laboratories he ranked high in the number of patents granted. Professor Horton is now on leave of absence from Technology and is serving at New London, Conn., on a project for the National Defense Research Committee.

One of the most impressive signs of our rapidly approaching old age is the vital statistics reports from our classmates. No longer do they deal with marriages of '14 men or of junior members of our clan — but with grandchildren. Another of our mates to join the granddaddy class is Leicester Hamilton, who achieved that honor last June.

Your Secretary recently had the pleasure of lunching with Ross Dickson in New York, where we went over the many problems arising in connection with the Alumni Fund campaign. Ross called attention to the following article in the current issue of the *American Gas Association Monthly*: "George Whitwell, vice-president in charge of sales of the Philadelphia Electric Company, has been appointed chairman of the A.G.A. Laboratories Managing Committee. . . . Unusually active in American Gas Association affairs, Mr. Whitwell has been a member of its advisory council and board of directors, as well as chairman of a number of its working committees.

"Mr. Whitwell has a most enviable record of accomplishments in the gas industry. Outstanding as an engineer, he is best known as co-inventor of the Young-Whitwell back-run carburetted gas process now employed under license in more than 300 manufactured gas plants in the United States and abroad.

"Graduating from . . . Technology, . . . Mr. Whitwell was first employed as Research Engineer with the Anaconda Copper Company, Butte, Montana. He resigned this position to join the Photographic Section, Aviation Corps, United States Army during the World War. From 1920 to 1922 he was engaged as instructor at the University of Washington, Seattle, serving at the same time as consulting engineer of the Tacoma Gas and Fuel Company. During 1923 he developed the back-run process with D. J. Young, then manager of that company. In 1924 he was appointed its general superintendent and new business manager.

"In 1925 Mr. Whitwell became manager of gas properties of the Byllesby Engineering and Management Corporation, Chicago, and one year later he joined the Equitable Gas Company, Pittsburgh, Pa., as general manager. In 1927, he was named general sales manager of the Philadelphia Company, Pittsburgh, Pa., later becoming vice-president in charge of sales. He was appointed

vice-president in charge of sales of the Philadelphia Electric Company in February, 1931.

"In addition to his extensive activities in the gas industry, he has also won acclaim for founding the 'Better Light, Better Sight' movement in 1933, which is still conducted by the electric industry. In recognition of this work he was named co-recipient of the 1935 James H. McGraw Award for Cooperation. As a tribute to his outstanding achievements in sales management, he was given the 1940 Howard G. Ford Award presented by the Sales Managers' Association." — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

## 1915

To all classmates a Happy New Year! — Help! *help!* Pay your class dues and really help Azel. With payments have come many pleasant and interesting letters from all over the country. First, from ever loyal Mary Plummer Rice: "I keep very busy with the Motor Corps and forget that bills come due. We have had a great deal of practice driving big four-speed field ambulances, containing six stretchers, that are being sent to Africa. I really wish I could go with them. We drove nine of them in convoy through New Jersey and Pennsylvania to the Canadian border and back through New York State for eight days, and I hated to have to give them up. It makes housewifery very dull. In August we took a load of supplies to H.M.S. *Rodney* at South Boston, and had a chance to go over that battleship. It was magnificent. Next trip I'll phone you and hope for the lunch you promised." I, too, Mary, am still looking forward to that lunch.

In last month's notes I omitted Ernie Loveland as present at the Associated Industries of Massachusetts meeting in Boston. He was there with several other classmates. From North Brookfield, Mass., he writes: "My new job is going fine. I saw Weare Howlett and Max Woythaler recently at a meeting in Boston."

Virgil Wardwell is in Scotland doing construction work for the George A. Fuller Company and the Merritt, Chapman and Scott Corporation. I hope he writes to tell us his war experiences. — Sympathy comes from Bill Spencer, who writes from Baltimore: "I know what a thankless job it is to collect class dues. . . . Give my best to any of the boys you see." — Bill McEwen has a son in the freshman class at M.I.T. this year, and Bill expects to come to Cambridge sometime in February. Andy Wardle and Alton Cook sent contributions for the class treasury and best wishes to all the gang.

Fiske Jones wrote: "I am traveling almost constantly on defense work, but have an apartment in Boston. . . ." Robert Welles: "Although I come east every summer, having to stay on the Pacific Coast until the schools here let out makes it hard to reach New England for any

## 1915 Continued

class reunion. I am going to make it some day. . . ." Hank Marion: "Hope to see you next time you are in New York." Orton Camp: "I am glad to send my class dues and do my part to help." Good old Dave Hughes: "No, I'm not in the Navy this war. I just got back from Tahiti and French Oceania, where I had been since May." (Wouldn't we all like to know what Dave was doing down there!)

Larry Landers: It is my hope that sometime I will be the first one to send you my annual dues check. . . . Whenever an occasion arises to talk about M.I.T., I always sing out in the highest terms the great spirit that our Class has enjoyed ever since 1915. And, when we all say that '15 is the best Class ever, we ain't lying. . . . I notice that you are now on State Street with the rest of the millionaires." Hey, hey, Larry, don't let the address fool you. It's only for mailing purposes.

Charlie Williams: "I heard a voice calling in the wilderness, 'Help Azel,' and am rushing to the scene with my check, which I hope will help to keep the Class solvent and Azel W. Mack still smiling. . . . Here in New York things are going along in humdrum fashion because of the failure of the Boston branch of '15 to come this way more often. How about another safari soon?" The best answer, Charlie, is that the trek of the Boston gang to New York will be in January, and we all hope that you will join us then for our big class dinner. We hope to have a luncheon in Philadelphia in January, too.

After a long illness, Jimmie Franks died in Philadelphia on November 5. The boys in Philadelphia and Herb Anderson notified me and sent flowers. From Mrs. Franks we received this message: "Your fine letter bringing a message of sympathy from the 1915 Class touched me deeply. You paid Jimmie a wonderful tribute, and no one ever deserved it as he did. I also want to thank you and all the members of the Class for the spray of beautiful white lilies. How much Jimmie would have appreciated your remembering him! He never ceased to talk of the old Technology days and his beloved friends, and we had always looked forward to the day when I could meet you all. . . . Jimmie was so happy to go back to the reunion, but he was in great pain then; it was not until last March that his case was diagnosed as a rare type of cancer of the lung. Everything known to medical science was done. We called in the finest doctors and surgeons to be had — three operations — but nothing could save him. He put up the most wonderful fight. His patience and courage will live on as an inspiration not only to his family but to all who knew him. . . ."

George L. Skofield, Jr., passed away in San Pedro, Calif., on July 10. The news has just reached us. Pierre Jones died in Brooklyn, N.Y., on October 31. To the families of these three men we have sent our sympathy. I had not seen Skofield and Jones since school days, but I

recall the pleasant time we had with Jimmie Franks at the Oyster Harbors reunion.

I recently visited Charlie and Bea Norton in Vineyard Haven at their sheep ranch, which Charlie is expanding. Classmates who were at Oyster Harbors will be surprised and amused to know that Charlie has replaced with blue paint the red paint we gave him at that time. I don't know yet whether the blue is more effective or has produced a better result, but no doubt Charlie will sometime tell us the reason for his change.

Everyone knowing Louie Young's proclivities as a fisherman will appreciate how well the message which was enclosed with his class dues' check fits him: "*The fisherman*. He riseth up early in the morning and disturbeth the whole household. Mighty are his preparations. He goeth forth full of hope. And when the day is far spent, he returneth smelling of strong drink, and the truth is not in him!" — Help! help!! Pay your class dues and really help Azel. — AZEL W. MACK, Secretary, Room 3-219, M.I.T., Mass.

## 1916

The Advisory Council on Athletics hopes to secure \$1,000 from graduates to assist in meeting the expenses of undergraduate athletics at the Institute. This worth-while activity is recommended to members of the Class in the hope that some will make contributions, which should be addressed to Ralph T. Jope '28, Secretary, Room 3-219, M.I.T.

The New York Times on November 18 carried a picture of Maurice Holland and announced his appointment as research adviser to the Pillsbury Flour Mills Company. Holland for the last eighteen years has been director of the division of engineering and industrial research with the National Research Council in New York City.

G. H. T. Washburn, IV, is now working with the United States Government in connection with some operations on the island of Trinidad. He wrote the following: "This is a really beautiful country, and the location of our operations here are ideal, with plenty of good fishing and bathing at our front door and the mountains full of game at the rear door. The weather is O.K.; cool nights, and the rains during the day keep it from being too hot."

Joe Barker has been appointed professor of electrical engineering and acting executive officer of the department of electrical engineering at Columbia University. The New York Times of October 23, in an article covering the dedication of part of the East River Drive in New York City, had the following to say about Walt Binger: "Walter Binger, Commissioner of Borough Works, who returned from an engineering survey in England recently, disclosed that much of the rubble that went into the construction of the East River Drive had come from Bristol, having been brought over as ballast. The people of Bristol, Mr. Binger said, were glad to help New York

City complete a public improvement by contributing this evidence of Nazi destruction." — JAMES A. BURBANK, Secretary, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, Associate Secretary, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

## 1917

Members of our reporting staff are being hounded by Win McNeill to get going among their local groups on the reunion. Mac reports that he has had enthusiastic reports of progress from several of these gentlemen and that he has also had some fine meetings with the New York crowd.

A group of ten of us in Boston had a luncheon meeting a short time ago to get our organization under way. Tubby Strout graciously accepted the job of chairman and guided us through a fairly serene meeting. — On November 25 we had a class dinner at the Continental Hotel in Cambridge.

The principal topic of discussion at the luncheon was the class gift. We have forwarded the suggestion to the reunion committee that they consider the establishment of a Class of '17 Scholarship Fund, the benefits of which should preferably be given to descendants of the Class. We understand that the collection of this money can be handled in a very simple and effective manner along with subscriptions to the Alumni Fund. This information is not official, and you will probably hear more about the matter from the reunion committee.

A further suggestion was passed along to the committee that a few hundred dollars of the money raised should be diverted to the purchase of a sailboat to be presented on Alumni Day to the Nautical Association in recognition of the cardinal services of Jack Wood, who has contributed so much in making this activity successful and popular. Lobby advanced two excellent reasons for buying a boat somewhat larger than the regular Tech dinghies. First, as a gift from such an illustrious Class, the craft should be bigger and better; second, if Jack wanted to take members of the Class for a sail, a dinghy would offer serious problems, being built for two people and having, therefore, a limited tonnage capacity. Lobby, being modest, said he was not speaking for himself, but used Stan Hyde as an example of what he meant. As a matter of fact, we know that the Nautical Association would very much like to have another one hundred and ten. This is the racing nickname for the Lawley 110 class, which displays the number as a racing insignia on the mainsails. The Association now owns three of these craft. They are of rather a radical design, being pointed at both ends like a canoe and having a very narrow beam. We think that Stan, Lobby, and others we might mention would still be out of luck, for, though we have made no measurements, observation leads us to believe that their beams are somewhat broader than that of this boat. — We should perhaps consult Potts



1917 Continued

Mehaffey on this matter, for we received a letter from him on very official stationery which carries instructions in the corner reading: "In reply address not the signer of this letter, but the director, the David Taylor Model Basin." Potts, now on active duty with the Navy, is enjoying his job with the Bureau of Ships. Models of ships are tested and other important experimental work is done in this division.

Dick Loengard and his United Chromium, Inc., are, as might be expected, making a real contribution to the defense program. They have been able to develop a copperplating process which is instrumental in saving appreciable thicknesses of copper, and also some coating materials which effect a saving in essential metals in various operations. Dick reports that his company is receiving excellent co-operation from the powers that be in the rationing of materials.

We met John DeBell, who is still a consultant on plastics, in Boston recently. With his customary exuberance he informed us that he had met several of the fellows in his recent travels. We thought we had all the material for these notes right then and there, but the plastic part of John's brain started to congeal and he could finally think of only one person he had met.

If you have occasion to write to Dud Bell for any news of the Class, be sure to choose a time which suits Dud's convenience, or you will probably get a reply like this: "This is not the time for me to send any dope. I'm leaving today for a trip to California via Texas. I'll see Senter and all the boys along the way; then I'll write some news. I've decided to retire and enjoy the rest of my life. The thought occurs to me that I should drum up attendance for our reunion next June."

Part of Dud's itinerary was confirmed by a special flash from Senter, our Dallas correspondent, who advised us via special delivery air mail: "Dud Bell, accompanied by his lovely bride, is arriving in Dallas. . . . Dud will stay with his brother, Frank F. Bell '09, Vice-President of the Uvalde Construction Company."

"We expect that Dud will be the guest of the local alumni club at the annual meeting on Monday, December 1. Dud is expected to throw considerable enlightenment on the cause and method of transition from outstanding class bachelor to sedate old benedict, which transition, we are advised, has resulted in a complete transformation of our erstwhile ebullient Dud — all for his own good and benefit. His remarks and conduct will, of course, be closely observed by the undersigned and other members of the single estate, in the hope of obtaining some useful information on this subject."

We were delighted to receive another letter from Texas, this one from Robert N. Gay, who wrote on November 3: "I was called into the Army on November 25, 1940, and I am the chemical officer of the 36th Infantry Division, with the rank of lieutenant colonel. I have a rather soft job, as chemicals are not being

used in the war. My biggest job is to conduct chemical warfare schools for the gas officers and gas noncommissioned officers, and then see that they pass on the information to the troops. I expect to start another school within the next week or so, but I have delayed because so many men are absent from camp on furlough after having returned from the Louisiana maneuvers, which were something! Believe me, we had no time for fishing during those two months!

"Camp Bowie is quite a place. Close to thirty thousand men are here now, and the camp is being added to all the time. . . ."

A clipping from a Seattle, Wash., paper carried an interesting tale of a flower-arrangement contest for men, staged by the Washington Athletic Club. The combination of masculine vanity and feminine curiosity made the affair an outstanding success. About one thousand people attended, including a *Life* photographer. Among the entrants was one Neal Tourtelotte, who took two second prizes, one in the "smallest humorous" class and another in the "arrangement in a bottle" class. Neal writes that the affair was a riot. We suggest that our reunion committee engage him to run a contest of this nature in June. It might be quite a contribution to the Alumni Dinner program.

Thanks go to Frederick Bernard, our occasional correspondent, who wrote the notes for this issue. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

## 1919

Best wishes for a happy and prosperous New Year. Your Secretary urges members of the Class to help in any way they can to increase the number of our members who subscribe to *The Review* through their donations to the Alumni Fund. Our contributions are below the quota that was set for '19.

Philip R. Brown has moved from Akron, Ohio, to 1563 Washington Street, East, Charleston, W.Va. — R. L. Burbank writes to say that the '19 column in *The Review* is his best contact with M.I.T. "It is the first thing I turn to when *The Review* comes through." Burby lives at 39 Tennyson Street, Somerville, Mass., and is still single. He is a fire insurance inspector and sells fire and casualty insurance, though he has not been outside of New England and New York for about five years. He plays an occasional game of golf and works about the house.

Bernard S. Coleman spoke before the National Conference of Social Work and New Jersey Tuberculosis League at Atlantic City on June 3 on "Mass X-Raying of Tuberculosis Workers." — Ev Doten wrote from 4370 Grayton, Detroit, Mich., that he was in Boston and Washington recently. He had planned to stop in New York but had to get back too quickly. Ev is married. — Jack Fleckenstein is still with the Crystal Refining

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Company at Carson City, Mich. He writes from 419 Union Street, Ionia, that all is well in his neck of the woods. He has a wife and two daughters, aged ten and twelve, travels most of the time, and does some hunting.

Ralph H. Gilbert, 238 East 31st Street, Brooklyn, N.Y., says that he hopes we can have a '19 dinner soon. Your Secretary expects to be able to arrange a class dinner sometime in the near future. — L. A. Gillett is district manager of the W.P.A. and resides at 2707 Ridgewood Avenue, Cincinnati, Ohio. He has one son, fifteen, and as a hobby collects steel railroads, although he does little traveling.

Maurice E. Goodridge writes from 120 Amherst Street, Worcester, Mass., that he is with the Worcester County Electric Company in the power sales department. Maurice has a wife and three daughters, aged thirteen, eleven, and six. — T. L. Goodwin, Jr., wrote from 3402 Parsons Boulevard, Flushing, N.Y. He works for the Consolidated Edison Company of New York, Inc.

Roger T. Hall, 532 20th Street, Northwest, Washington, D.C., is president of Sweetman and Hall, Inc., a heavy construction firm. Roger has no family; he fishes and plays bridge for pastimes. His traveling is confined to within his locality. He gets in touch with Fred Hewes occasionally. — Celeste Brennan Hayden informs us that she has three sons, two daughters, and a husband. She resides at 2825 Berwick Road, Birmingham, Ala. Her travel consists in acting as chauffeur for her family. Your Secretary appreciates this information from her and hopes to hear more about her family.

A. W. Hough represents District 3 on the National Nominating Committee of the Alumni Association. — C. W. Hyde, 2909 Mapleshade Road, Ardmore, Pa., works for Day and Zimmerman, Inc., has a wife and three daughters, and spends his spare time playing golf. Hyde has talked with George Rowell '92 and H. S. Davis.

Rogers B. Johnson writes from 42 Oak Street, Belmont, Mass., that he is superintendent of maintenance at Harvard University. He has a wife and one son, aged thirteen, spends his spare time at his summer place in New Hampshire, and has had a fair share of traveling, having been to Europe twice and to the Pacific Coast. — Arthur C. Kenison, who is with the New England Mutual Life Insurance Company, recently appeared in a full-page advertisement of that company. — Harry H. Mardoian lives at 36 Maplewood Road, New Haven, Conn.

George McCreery, our worthy Assistant Secretary, is a member of the Corporation Visiting Committee on the Department of Building Engineering and Construction. — Uhachi Nabeshima has sent in word that his address is No. 1 Koishikawamachi, care of Nippon Hatsu-Soden KK, Koishikawaku, Tokyo, Japan. — Victor N. Samoyloff has changed his address from Millville, N.J., to care of Mr. Stalew, Suite 2301, 63 Wall Street, New York, N.Y. — Edward Saunders, his wife, and three children — Ted,

Gertrude, and Eugene — attended the annual picnic of the Washington Society of the M.I.T.

Edward E. Scofield represents District 10 on the National Nominating Committee of the Alumni Association. — Earl P. Stevenson has been honored by the awarding of the honorary degree of master of arts by Wesleyan University in Middletown, Conn. — Russell J. Widdowson, V, now resides at 752 Franklin Street, Melrose, Mass.

Your Secretary attended the American Petroleum Institute convention in San Francisco, Calif., from November 3 to 7. Since then he has been staying close to New York City. — Here's for bigger and more letters from the Class in 1942. — EUGENE R. SMOLEY, *Secretary*, Lummus Company, 420 Lexington Avenue, New York, N.Y. GEORGE W. MCCREERY, *Assistant Secretary*, 131 Clarendon Street, Boston, Mass.

## 1920

Henry C. Pierce died on October 23. He was married and had a two-year-old son, Henry C. Pierce, Jr. Hank was coach of the Newton Y.M.C.A. track team and turned out teams of the championship caliber, holding a two-state championship for the past four years. Those who remember Hank's prowess as a track man in the old days will be interested to know that he kept up his interest. Track coaching was his hobby, and he was a statistical accountant for the Walworth Company.

The wedding of Tony Anable to Gloria Elaine Hollister was announced in the November Review. An additional item of interest is the fact that Prentice Ash was best man. Tony, as many of you know, is a noted authority on navigation and an active member of the Cruising Club of America.

Irwin L. Moore has recently been elected president of the New England Power Association, New England's largest public utility system. Moore is married and has two sons. — Carleton Alexander is now in Cincinnati at 4965 Relleum Avenue. Bill Barron is living in Great Neck, Long Island, N.Y., at 7 Hutchinson Court. Ed Bragg is in Greenwich, Conn. James Wolfson is in Neponset, Long Island. Charlie Klingler is in Santa Barbara, Calif. Dean Willey is general mechanical superintendent of the New York, New Haven, and Hartford Railroad and is located at the New Haven offices.

I have just received word of the death of E. R. Monasterio of Cienfuegos, Cuba, on April 3, 1939. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

## 1921

To you and yours, at this turn of the year, health and happiness — and the realization of your resolutions to write to your Secretaries. — Robert E. Waterman, X, is in the news as the chief assistant to Dr. R. R. Williams, research chemist who tracked down vitamin B<sub>1</sub> and who subsequently synthesized it. In an

article, "Morale in a Test Tube," in the November 1 issue of the *Saturday Evening Post*, Dr. Williams is reported to have persuaded Bob to assist him in his leisure time. The article further relates that "Waterman spent the next fifteen years at it without pay, eventually marrying the eldest Williams daughter. He insists that he functioned chiefly as a mental sparring partner and comic relief. Nevertheless, his work in the isolation stages of the experiments earned him, along with six other chemists, a share in the royalties from the Williams patents.

"The royalties . . . are nearing the million-dollar mark. Each of the seven researchers now receives from one to seven per cent of the returns, their percentage having been graduated downward after the first and second \$100,000 like an income surtax in reverse. . . . The Research Corporation, which Bob Waterman helps run, administers the balance. Sixty thousand dollars have already been disbursed from the accumulated Williams-Waterman Fund for the Combat of Dietary Diseases." — Bob's business address is care of the Research Corporation, 405 Lexington Avenue, New York City, and he makes his home on Spring Valley Road, Morristown, N.J.

William C. Ready, I, now a Captain, rated headlines and a picture in the *Boston Herald* with the news of his appointment as deputy zone construction quartermaster for Zone 1 of the Army Quartermaster Corps. Bill will supervise the activities of the construction division in the New England states, covering all work pertaining to construction, maintenance, and repair. Bill's headquarters are at the South Boston Army Base. Victor S. Phaneuf, II, another Captain, is also a construction quartermaster. Vic is located at Fort Ethan Allen, Vt.

Paul L. Deylitz, a Lieutenant Colonel, is adjutant at the Rock Island Arsenal, where he has just completed twenty-three years as a commissioned officer in the Army. Paul was graduated from the United States Military Academy in 1918 and then attended Technology and the command and general staff school at Fort Leavenworth. He went to Rock Island in 1939, after serving four years on the faculty at West Point. In addition to being adjutant at the arsenal, he is also summary court officer, recreation officer, and mess officer. Paul and Mrs. Deylitz and their thirteen-year-old daughter live in the administration building on the island.

Ray St. Laurent writes that he and Bob Miller are undertaking a co-operative project of editing and splicing all the movies which they took at our twentieth reunion last summer. If anyone has additional footage to contribute, send it to Ray at the address below. Prints of still pictures will also be appreciated for the class files. We plan to show the pictures at Alumni Day next June 8.

The following classmates were seen at the fall smoker of the M.I.T. Club of Northern New Jersey, held on November 12 at the Newark Athletic Club: Max Burckett, who is president of the Club,

Chink Chatham, George Chutter, Phil Coffin, Max Goldberg, Morris Hart, Fred Kowarsky, Ralph Lockwood, Ralph Wetsten, and Cac Clarke.

Charles Lovelace Foster, VII, died at his home in Covington, La., on July 26. He had retired from active service in the Army Medical Corps. Our sincerest sympathy is extended to his family.

John W. Barriger, 3d, XV, has tendered his resignation as chief of the railroad division of the Reconstruction Finance Corporation and is now associated with the Western Carriers Conference Committee. Johnny entered railroad service in 1917 as a shop hand in the Altoona shops of the Pennsylvania Railroad Company. He was furloughed from the shops to attend Technology, and he worked, during his vacations, as a laborer in the maintenance department of the Pennsylvania. Following graduation, he was a member of the Pennsylvania engineering department until 1927, after which he held several important railroad positions.

John Campbell, XIV, technical director of the International Paper Company of the United States and Canada since 1929, has resigned to accept a position with the Reynolds Metals Company of Richmond, Va. The Reynolds Company is building a number of aluminum plants throughout the country, and Dr. Campbell will become general manager of one of these plants.

Following graduation, John was technical adviser for the Johns-Manville Corporation in this country and the Abitibi Power and Paper Company of Canada. During the first World War, he was manager of an electrochemical plant in England in which material used in incendiary and thermite explosives was manufactured.

The new addresses of the month are: Dr. Axel G. H. Andersen, III, Box 757, Oakdale, Long Island, N.Y.; Alfred H. Fletcher, XI, School of Hygiene and Public Health, Johns Hopkins University, 615 North Wolfe Street, Baltimore, Md.; Dwight V. Gregory, V, 5020 Dermond Road, Drexel Hill, Pa.; Major Dugald C. Jackson, Jr., VI-A, Frankford Arsenal, Bridesburg Station, Philadelphia, Pa.; Commander James L. King, II, Bureau of Ordnance, Navy Department, Washington, D.C.; Herbert W. Reinhard, XV, 248 Mower Street, Worcester, Mass.; Arthur W. Skilling, I, 99 Grace Church Street, Rye, N.Y.; David O. Woodbury, VI-A, 1273 California Road, Tuckahoe, N.Y. — Write that note now. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, International Telephone and Radio Manufacturing Corporation, 67 Broad Street, New York, N.Y.

## 1922

Reunion plans are under way. An announcement will be made in this column and by direct mail in due course. Start talking up the reunion and making your plans for the big get-together next June. The reunion committee, consisting of the officers of the Class, had its first meeting



## 1922 Continued

preceding the class dinner at the Technology Club in New York on November 13.

Thirty-six classmates attended the '22 dinner, and all had a glorious time, as Bill Mueser, who ran the affair, had promised. Jim Killian '26, executive assistant to President Compton, came from Cambridge to tell us what the defense program means to the Institute and about the vital part that the Institute is playing in the defense program. Those present were: Allen, Bryden, Burke, Burrus, Cherniack, Chittick, Coddling, Dandrow, Duge, Edmonds, Elmer, Warren Ferguson, Folinsbee, Grady, Gray, Grover, Ham, Hickernell, Holderness, Jones, Kurtz, Liecny '24, Lawson, Mueser, Molinar, Reynolds, Rockefeller, Rogers, Rundlett, Shampianier, Strauss, Teeter, Tyson, Van Pelt, Jr., Vilett, and Westcott. The long-distance records were made by Yard Chittick and Warren Ferguson from Boston, Frank Westcott from North Attleboro, and Herb Ham from Springfield, Mass.

The M.I.T. Club of Northern New Jersey fall smoker was held on November 12, the night preceding the New York dinner, and ten men from '22 were present. — On September 21 the Boston *Herald* carried an announcement of the engagement of Phillippa Patey of New-tonville to Douglas M. Burckett of Boston.

The following members of the Class were seen at the annual meeting of the American Gas Association in Atlantic City during the week of October 20: P. M. Alden, from the Philadelphia Electric Company, Philadelphia, Pa.; E. H. Eacker, Boston Consolidated Gas Company, Boston, Mass.; F. M. Banks, Southern California Gas Company, Los Angeles, Calif.; W. K. MacMahon, Rosslyn Gas Company, Arlington, Va.; E. W. Vilett, Public Service Corporation of New Jersey, Newark, N.J.; and C. D. Grover, Whitehead Metal Products Company, New York City.

The *National Petroleum News* of November 5 carried an article of great tribute to Paul Ryan of Cleveland, Ohio. Ryan, who was president of the National Refining Company, was almost killed in an airplane crash near Chicago Airport on December 4, 1940. It was in this same accident that our classmate, C. W. Manville, was killed. Ryan was so badly lacerated and injured that the doctors practically despaired of saving his life. On crutches, he was able to pull himself to the platform early in November, however, to address the workers of Cleveland's Community Fund drive. Describing the occasion, a writer of the Cleveland *Plain Dealer* said: "When Fighting Paul Ryan, who a year ago was a vigorous, strong man, and who, God grant, will be a strong man again — when Paul Ryan twisted himself into his chair and sank down, still fighting — every person in the banquet hall stood and applauded — and they stood there and stood there and applauded and applauded, and a few of them blew their noses. . . ." Three days later the Community Fund went over the top.

Read that article if you get a chance. We are proud that we can count Paul Ryan as a fellow Alumnus and are devoutly thankful that his life was spared and that he is making progress back to health and vigor. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. C. YARDLEY CHITTICK, *Assistant Secretary*, 77 Franklin Street, Boston, Mass.

## 1923

Jack Keck sends a clipping which describes the special defense activity of the wife of one of the prominent members of the Class. It says: "An experimental vitamin study to determine the best diets for army men under different climatic conditions is being conducted at the Merck Institute at Rahway by Mrs. Theodore M. Edison of West Orange."

Pete Pratt left his position as western division manager of the General Foods Corporation after more than eighteen years with that organization. He is now a major in the Coast Artillery Corps, executive provost marshal, Sixth Corps general staff, Chicago, where he is now located, with offices in the Civic Opera Building. He says his current responsibilities involve engineering surveys of essential transportation, communication, power, and food facilities. In October, he attended the first officers' training course in civilian defense at Edgewood Arsenal, Md. There the officers are given considerable instruction in the handling of war gases, incendiaries, and explosive bombs.

The instruction at the Chemical Warfare School at Edgewood Arsenal, which Pete mentions, is very interesting. I have been at the school a number of times, once to give a lecture on fire protection equipment to the civilian defense school for fire and police department officers. The purpose of the civilian defense school classes is not only to train army officers, but to train fire and police officers who can in turn train instructors for the general public. The theory is that a good way to discourage enemy air raids is to have a population trained to minimize the effect of them.

Your Secretary is serving on a fire defense advisory committee of the United States Office of Civilian Defense. One of the problems is to figure out the amount and kind of fire-fighting apparatus to be provided to American cities to deal with air-raid fires.

W. E. Ditmars, President of the Gray Manufacturing Company, reports that he has moved from New York to Hartford, Conn., to be nearer his plant, which manufactures certain electrical specialties needed for defense.

Herb Hayden says that in June he was transferred to the Kankakee Ordnance Plant as superintendent of maintenance, to organize and operate a maintenance department. He was looking for some experienced mechanical engineers interested in maintenance work. He writes from a new home in Dwight, Ill.: "For several years I have been superintendent of main-

tenance and construction at the Leominster, Mass., plant of E. I. duPont de Nemours and Company. Last February I was transferred from the plastics section to the explosives division. I spent three weeks in Memphis at the smokeless-powder plant and then went to the Indiana Ordnance Plant at Charlestown, Ind., as a maintenance engineer. — Our family is comfortably located here in Dwight. We have three children: Billie, aged sixteen, a senior in high school; Helen, aged fifteen, a sophomore; and Marjorie, aged thirteen, in the eighth grade."

A Washington, D.C., paper tells of the opening on October 2 of the new retail store of Sears, Roebuck and Company in that city. Fred Lindtner is manager of this new store. The clipping recounts Lindtner's ten years with the Sears organization in stores in Newark, New York, Buffalo, and Rochester. In Rochester, from which he came to Washington, he was a trustee of the Chamber of Commerce. The paper further mentions that Lindtner's thirteen-year-old twins, Nick and Bob, and their brother, Michael, seven, are looking forward to living in Washington. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree, Mass. JOHN M. KECK, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

## 1925

The best sign of a successful business is a satisfied customer. The offer made several months ago, to supply addresses of '25 men to members of the Class who request them, is "successful." I have one satisfied customer, Henry Sachs. Henry wanted to know the address of Ed Piepho, and I supplied it. Here is Henry's reply, written on an American Airlines post card: "Thanks for your letter about Ed Piepho. I have been awfully busy getting ready to leave. Am receiving Christmas cards care of Military Attaché, American Legation, Cairo, Egypt. Best wishes and the season's greetings."

I have had no little trouble in keeping up with Frank McGinnis. Two years ago he was here in Boston. At the 1940 reunion he said he was located in Baltimore. When I went south on business later in the year, I looked him up, only to find that he was no longer there. Recently we had an announcement of his engagement to Ursula J. Regan, but still no exact address. The wedding announcement, however, now in hand, was accompanied by his addresses. Frank was married on Saturday, August 23, at Alameda, Calif. He is assistant to the regional director of the Surplus Marketing Administration, Philadelphia, Pa., and lives at 1855 North Park Street, Philadelphia.

Frank may have been a little slower than some of us, but he has finally taken the step. Congratulations, and long life and happiness to him and the new Mrs. McGinnis. — HOLLIS F. WARE, *General Secretary*, 3 Aquavia Road, Medford, Mass. F. LEROY FOSTER, *Assistant Secretary*, Room 7-121, M.I.T., Cambridge, Mass.

## 1926

By now you will have received the annual report of the M.I.T. Alumni Fund and had a chance to note how '26 stood in relation to other classes. Last year 224 members of the Class contributed \$1,629, an average of \$7.30 a man. With one exception, the Class of '23, we had the highest average contribution of the graduates in the Twenties. In the percentage of the total membership of the Class contributing, however, we were exceeded by several other classes in our ten-year group.

The last report which the Secretary has received on the progress of the Fund this year shows that out of a total quota of 310 contributors, '26 has had 164 contribute, or 53 per cent. Our total quota in dollars is \$4,025, and by October 25 the total amount contributed was \$1,309, or 33 per cent. The moral in these figures is obvious, and I hope that our Class can go to bat and hit a home run before the 1941-1942 campaign is completed.

Only one item of information has reached the secretariat since the last issue of The Review, and that has to do with a case presented to the United States Court of Customs and Patent Appeals, of which our own Leo Teplow of the patent department of Allis-Chalmers Manufacturing Company was named among the counsel. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

## 1928

Very few choice morsels about the doings of classmates have been called to the attention of your Secretary since his all-out effort for the November issue, in which he used every crumb of available information.

Lewis Hess, V, was married during the summer. Unfortunately, we have not learned the former name and home of the present Mrs. Hess. Lewis is working for the Ethyl Gasoline Corporation and is living at 19318 Pinehurst Avenue, Detroit, Mich. The congratulations and best wishes of the Class are yours, Lewis.

Members of Course VI will be especially interested to learn of the work of Tsu Ye Lu, who is now located in Hong Kong. Lu wrote the following letter to Ralph R. Lawrence '95, Professor of Electrical Engineering at the Institute: "When I returned to China in 1929, Ke-Chung Chang '25, then a professor of Nankai University, asked me to join him and teach a course in physics and some laboratory work in the physics department in that university, which I gladly agreed to do. The following year the President, Dr. Po-Ling Chang, wanted me to start the electrical engineering department right away. Because of my inexperience as well as my incompetency, I politely declined. Owing to President Chang's insistent asking, the curriculum as well as laboratory site and equipment were carefully planned by me single handed. So, in 1931, the electrical engineering department was formally announced, and with reluctant consent I

was promoted as the head of that newly formed department. In teaching I may proudly say that I am mainly following the schedule which M.I.T. offered, with some modification in order to fit the teaching schedules of other departments. In 1934, if I remember right, I had the first opportunity to show the newly formed department to Karl L. Wildes '22 [Associate Professor of Electrical Engineering at the Institute], who was then the visiting professor at Tsing-Hwa University, and to get his valuable advice as well as respected encouragement. The textbooks and references used are mainly in English. In order to lessen the students' work, it was proposed to and approved by the ministry of education to translate recognized textbooks and references into Chinese. The translation work was voluntarily taken up by those interested in it, and the translated textbooks, before publication, must be sent in and passed by a committee, the members of which were appointed by the ministry of education. I was approached by Yu Hsiu Ku '25 to translate your books, *Principles of Alternating Current* and *Principles of Alternating Current Machinery*. Since those two books were adopted as text-books in Nankai electrical engineering department and I have been teaching those courses four years, I thought it my duty to accept Dr. Ku's kindness, and the work of the translation on *Principles of Alternating Current* was started in 1935 and finished in the year following."

Recently Ralph Joje met Pete Zugale, VI-A, on a New York bound train. Ralph learned that Pete is employed by the New Jersey Bell Telephone Company at Newark. He has two children, a girl, four, and a boy, one. Pete has kept in touch with many other members of his Course and passed on information about Hal Curtis, Huyler Ellison, Chick Lyons, and Frank Sweeney.

Chick now lives in Upper Darby, Pa., and is working in the long-lines department of the American Telephone Company, in the Philadelphia office. Hal is with the Bell Telephone Laboratories in New York, where he has been actively associated in the development work of the coaxial cable. — Huyler is with the Long Island division of the New York Telephone Company and is living in Freeport. Working for the telephone company evidently pays dividends in being able to keep informed on the doings of your friends.

Frank Sweeney, the nontelephone man of Course VI-A, is still with the Graybar Electric Company. Frank has three children. The oldest is thirteen.

All '28 men who have not yet contributed to the annual Alumni Fund are urged to do so. In the recently released final report for the 1940-1941 Fund, which ended last June 30, '28 stood second in the classes through the Twenties in the percentage of men contributing. This year let's put '28 at the top, where it belongs. — Best wishes for the holiday season. — GEORGE I. CHATFIELD, *General Secretary*, 6 Alben Street, Winchester, Mass.

## 1929

With the best of New Year's resolutions your long-absent column is started again. Last year I was up to my ears in one thing and another, including a Dale Carnegie course given here in Akron. Now that I am back on the job, I'll start by wishing you all a happy and prosperous New Year.

The gang in Akron has moved around a bit since their activities were last reported. Hank Gibbons, II, has left the Goodyear Zeppelin Corporation and is now a stress analyst for the Vought-Sikorsky division of the United Aircraft Corporation in Stratford, Conn. He is the proud father of a son born about six months ago.

Johnny Hartz, X, who now affiliates with '28, is back with the Goodyear Tire and Rubber Company in Akron as a tire compounder, after a year at the Goodyear plant in Gadsden, Ala. — Harold Dick, II, is back from Germany. For a few years he was Goodyear's Zeppelin observer and representative in the German Zeppelin center at Friedrichshafen. He is now a sales engineer for Goodyear's heavier-than-air products. — Gene Gilman, X, has left Goodyear and is a partner in a local industrial hygiene laboratory. — Ted Ewald, XV, has come to Akron as an industrial engineer for the B. F. Goodrich Company. — Your Secretary is still in the development department at Goodyear, as manager of truck tire design.

Charles Mabey, VI-A, was married to E. Marion Kilpatrick of East Orange, N.J., last December. — The engagement of Dorothy I. Chandler of Orangeburg, N.Y., to Steve Dilworth, XV, was announced on August 7. The wedding was scheduled for September. — The engagement of John Dexter, IV, to Janet Fuller of Winchester, Mass., was announced on August 10. Plans were made for a fall wedding.

Len Peskin, XVII, who stayed at the Institute as an instructor to take his master's degree in Course III in 1931 and his doctor's degree in 1936, won a fine promotion in the American Steel and Wire Company. He is now technical engineer in the main offices in Cleveland, Ohio. For six years he worked for the company in Worcester as, successively, a research laboratory worker, a research engineer, and engineer in charge of transmission.

Robert G. Cowan, who was with us for two years in Course XV and who went on to study banking and finance at New York University and the graduate school of banking at Rutgers University, was elected on December 21, 1940, a director of the Mutual Benefit Life Insurance Company. He was recently made president of the National Newark and Essex Banking Company. He lives in New Vernon, N.J.

C. Clarke Keely, who was with us as a graduate student in Course I, has been a consulting civil engineer in Los Angeles, Calif. On January 21, he was appointed to the Water and Power Commission of Los Angeles. — Ralph B. Atkinson, IX-A,



1929 Continued

who was formerly associated with the Eastman Kodak Company in Los Angeles, announced the opening on July 1 of the Atkinson Laboratory for photographic and chemical research.

In February, 1940, W. Spencer Hutchinson, Jr., was superintendent of operations of the Fremont Gover Company's property in Drytown, Calif., where open-cut mining was employed on a large ore body estimated at 200,000 tons near the surface. If Bill is moving about the way he used to, he has probably had a half-dozen jobs since that.

Chaim L. Pekeris, VIII, who got his doctor's degree in meteorology at the Institute in 1934, is now a research associate in the Department of Geology. He took part in a Harvard Observatory conference on the sun and solar-terrestrial relations over the world. The purpose of the conference was to determine what areas do not receive enough health-giving sunshine, so that the people in those areas can fortify themselves with additional sunlight, probably in capsule form. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

## 1931

Art Bertollett is a captain, and his official address is Battery B, 53d Coast Artillery, Bermuda Base Command, United States Army, American Post Office 802. — George Humphreys is now located in Washington as manager of engineering for the Buda Company. All of his time is devoted to government work. — Gil Ayres is with the American Cyanamid Company in Stamford, Conn. — Bob Wilson is manager of the New Bedford store of Sears, Roebuck and Company. I saw Bob recently, and he informed me that Shel Smith has been appointed manager of the new Sears store in Newport, R.I.

Samuel Jacobson sent his reservation for the reunion, but unfortunately at the last minute he found that he couldn't make it. We have a newspaper clipping about his appointment as chief chemist and research director of the New Haven Water Company: "Dr. Jacobson . . . has been with the Maryland Department of Health for the past two years, dealing with problems of sanitation and with the diagnosis of infectious diseases. He is a member of the American Chemical Society, the Society of American Bacteriologists and Sigma Xi and Delta Omega, honorary scientific research and public health societies.

"Dr. Jacobson, by training and experience, is admirably fitted to carry on this program of research, which is vital to the protection of public health in New Haven and the outlying communities supplied by the New Haven Water Company system," the announcement of his appointment said."

Our thanks to Obie Denison, Secretary of '11, for the following information about Bob Knight. Bob has been appointed superintendent of the spring mill at the South Works of the American Steel and Wire Company at Newburyport, Mass. He became associated with that

company in November, 1932, as technical apprentice at the Trenton, N.J., works. In August, 1933, he was made foreman at the same plant, and in May, 1935, was promoted to the position of assistant department head. Four years later he was transferred to the South Works as assistant general foreman in the spring mill, which position he has held to the present time. Bob's home address is 51 Hadwen Road, Worcester, Mass.

Mr. and Mrs. Egbert Starr Newbury of Yellowstone Park, Wyo., have announced the engagement of their daughter, Frances Kellogg Newbury, to Gilbert Morgan Roddy. Gil is now on active duty as a first lieutenant in the Boston Ordnance District. Incidentally, we all owe Gil a vote of thanks for his efforts in behalf of the Alumni Fund. Those of you who have not responded to his latest appeal should dig out those forms and make your returns now.

Elizabeth W. Hubbard of Montclair, N.J., became the bride of Robert T. Leadbetter in a fall wedding at Montclair. After a honeymoon at Ocean Point, Maine, Bob and Mrs. Leadbetter are making their home at 51 Afterglow Avenue, Montclair. — Mr. and Mrs. David V. Buchanan announce the birth of a daughter, Marjorie Ann, on November 4. — BENJAMIN W. STEVERMAN, *General Secretary*, 14 Russell Street, Atlantic, Mass.

## 1932

At a joint luncheon in New York of three of the physical societies, we had a chance to have a few words with our busy Class Agent, Carroll Wilson. One of the subjects was the reunion, which I trust is the subject of conversation whenever two or more of you fellows get together. We should appreciate ideas on the subject.

Four of us were present at the M.I.T. Club of Northern New Jersey fall smoker: Don Corson, Herb Neustadt, Elwood Schafer, and your Secretary. Don lives here in Plainfield at 764 Woodlawn Avenue and works for the Cornell-Dubilier Corporation, manufacturers of condensers and similar articles. At a defense course in New Brunswick, he sees regularly Guy Barnett, who lives at 50 College Avenue there and works for the Johns-Manville Corporation. Elwood promised to send us a card. Although it hasn't appeared, we gather that the important news is that he is married and works for the National Radio Corporation in Newark. Herb is still interested in electronics and works for Richard H. Ranger '11 in Newark.

Rolf Eliassen came through very nicely with the following letter: "Minot Bridgman is now Captain Bridgman of the United States Engineers. He, his wife, and two children are now living at 3817 Wilson Boulevard, Arlington, Va. As we understand the situation, Minot is in charge of organizing clubs and basic operating groups among railroad employees for railroad operation during wartime.

"Swede Reidell is still with the Dorr Company, Inc., covering my old stamping ground on the Pacific Coast — from Montana and Washington to New Mexico and

California — the eleven western states. Bob Thompson is also with the Dorr Company at the research laboratory in Westport, Conn. He and his wife have a new daughter, born last summer.

"As for me, I am finally taking the step into matrimony on December 12. The girl is Mary F. Hulick of Easton, Pa. She is a graduate of Wheelock and has been teaching in Easton. We shall live at University Heights — 114 West 183d Street — New York. I am still occupied as associate professor of sanitary engineering at New York University and am busy with defense courses and consulting work. Last summer I worked for the Caribbean Architect-Engineer and had charge of the design of the sewerage treatment plant for the new army air base at Trinidad. Of late I have been working with Parsons, Klapp, Brinckerhoff and Douglas on the preparation of a report of sewerage treatment for Caracas, Venezuela. I have also been active as associate water consultant for the National Resources Planning Board. Let's get busy drumming up trade for the reunion."

Art Russell, 2308 North Illinois Street, Arlington, Va., wrote the following: "After six years with the Bigelow Sanford Carpet Company of Thompsonville, Conn., in their mechanical development department, I have been called to the Naval Ordnance Laboratory in Washington, D.C., probably for the duration. Knowing how tough it is to find lodgings in the city, we should be glad to accommodate '32 men who may be down this way."

Bill Barker wrote: "I'll see you next June at the reunion. I'm still with the Firestone Tire and Rubber Company. I am married and have one son. We built a new home at 45 Meredith Drive, Cranston, R.I., two years ago. I play a little poker and a little golf. My hair is a little thin, but I expect a heavy second growth for winter use. . . . Let's have a big turnout at the reunion and have a really bang-up time."

Carroll Wilson received a letter from Isaac H. Schwartz, telling of his activities since '32: "After graduation, Leo Cohen, VII, and I left for Bonn, Germany, to study medicine. We stayed in Bonn about six months, but things were growing unfriendlier, and new restrictions were being imposed on American students from time to time. These restrictions had their origin in Berlin, I am sure, as the local Rhineland population was one of the most sociable I have encountered in the course of my peregrinations.

"In March, 1933, Hitler came into power, and Leo and I both left Bonn — he for Vienna, and I for Switzerland, on a bicycle. This trip lasted twelve days, and the first city I hit after I crossed the border was Basel. By this time I was practically broke, so, as there is an excellent university in Basel, I decided to continue my studies there and was able to exist, until more dollars reached me, by taking my room and board in a pension. I was graduated in medicine in 1937, after doing some research in experimental pharmacology.

"During vacations I spent one summer on a motorcycle, traveling through Europe and progressing as far as Bucharest. On this trip, I had the doubtful pleasure of being in Vienna at the time of the unsuccessful Nazi *putsch* and the assassination of Dollfuss. I took another trip by boat to Palestine, where I established connections which led to my receiving a position in bioclimatology at the Hebrew University after my graduation. Before taking up this work I returned to America and married Caroline Mekelburg of Boston, whom I had been courting, largely by long distance, since my junior year at Tech.

"We remained in Jerusalem, where our daughter, Miriam, was born almost two years ago. By that time I had decided that the clinical rather than the research aspect of medicine appealed to me more. As medicine is about the most overcrowded field in Palestine, we returned to Boston, and I became an intern in the pediatric service at Boston City Hospital, where Elliot Giddon, VII, was also a house officer. I remained there for sixteen months and am now engaged in a general internship at St. Luke's Hospital in New Bedford.

"While in Palestine I received some photographs from a fellow alumnus who had been with me at Edgewood Arsenal, Md., in the Chemical Warfare Service of the Reserve Officers' Training Corps in 1931. I lost the note with his name and address and am unable to thank him. If he sees this letter, I should appreciate hearing from him. — The Review came to me regularly while I was out of the country, and I must say that it was truly inspiring when read in surroundings in which scientific endeavor was subject to political considerations."

Our President, Don Gilman, wrote that he is setting up a big class reunion committee. In an early spring issue we hope to bring you Don's ideas about our tenth. — CLARENCE M. CHASE, JR., *General Secretary*, 1207 West 7th Street, Plainfield, N.J. CARROLL L. WILSON, *Assistant Secretary*, Research Corporation, 137 Newbury Street, Boston, Mass.

### 1933

Greetings for the New Year — may it be prosperous and happy! We're glad to give you a copy of a letter received from Carlisle Barracks, Pa.: "The promotion of John Ward Regan, Jr., to captain in the Medical Corps of the regular Army was announced today (October 24) at the headquarters of the Medical Field Service School, Carlisle Barracks, Carlisle, Pa.

"Captain Regan, who is medical inspector and instructor in the department of military sanitation at Carlisle, is a graduate of Roxbury Latin School, M.I.T., and Harvard Medical School. He was called into service on February 14, 1940, and has been on duty at Fort Moultrie, S.C., and Camp Beauregard, La., prior to his present work at the Medical Field Service School." Congratulations to Captain Regan, VII.

We have received word of the marriage of Draveaux Bender, IV, to Sally B.

Kimball of Lexington. Congratulations! — Have you some news for this column? — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-104, M.I.T., Cambridge, Mass.

### 1934

King Crosby wrote the following letter from Huntington, W.Va.: "Parenthood is a wonderful thing! Normally, I am a modest and retiring individual (especially in the field of correspondence), but I am now quite willing — nay, anxious, — to write about the birth on October 3 of Philip Cheney Crosby. None of my experiences in the professional world have seemed important enough to justify a record in the class notes, but *this* is different.

"Approximately eight days each week I keep busy as a combustion engineer at the International Nickel Company's Huntington works. (Don't let my title fool you; the job is 90 per cent metallurgy.) Needless to say, our work is for defense, and old production records are mere scraps of paper.

"Jack Goheen '37 and I are upholding the honor of Technology by ourselves in the face of hordes from Pennsylvania State College and Georgia School of Technology. This task is, of course, herculean during the football season, when school spirits are keen. How often I've been thankful that Technology could never get eleven men together long enough to play football!

"Soon we expect to move into our new home, the Office of Production Management and the weather notwithstanding. The address is 5468 Pea Ridge Road, Huntington, W.Va. Incidentally we have a large lot and could pitch a tent to take care of visitors who may be traveling to, through, or near Huntington." — Our heartiest congratulations, King.

A letter from our Class Agent, Bob Roulston, gives us an angle on life in the Army: "Of course you know that Art Esslinger was called away from McCann-Erickson, Inc., by the Army. That was way back last February, about the same time that I got pulled in. At that time Dale Mabry Field was just an embryo, and you certainly wouldn't call it fully matured yet. This is a unit of the Air Force Combat Command, but we have no planes yet. Under real operations a group of pursuit ships would be stationed here.

"Tallahassee is the capital of Florida, but it is a sleepy city of about twenty thousand people. Each night the streets are carefully taken in. Soon there will be some good duck hunting. Golf and tennis help while away the afternoons.

"We all have triple-barreled jobs. My principal ones are assistant operations officer, recorder of the flying cadet board, and technical supply officer for the base squadron. Every time I turn around I get shoved on some board or committee. Real progress is being made, but sometimes I wonder if there will be time to do all the things that need doing.

"Last year I had a great deal of fun as our Class Agent for the Alumni Fund. Our Class surely rallied splendidly, and we raised over \$1,000. The directories that we've been working on are due to be mailed out shortly, so that they can be used for Christmas." Thanks for the news, Bob.

Freddy Barrett has left the Anaconda Wire and Cable Company in Hastings-on-Hudson, N.Y., where he was an assistant metallurgist, to become a research metallurgist for the Eclipse Aviation Corporation, a division of the Bendix Aviation Corporation, Bendix, N.J. — Joseph A. Hahn, Jr., will shortly be ordained as a priest. His present address is Maryknoll Seminary, Maryknoll, N.Y.

In our society column we have several bits of news. Hal Reynolds is engaged to Gertrude Hawes, daughter of Mr. and Mrs. Wilton L. Hawes of Newton Centre, Mass. Nice going, Hal. — Dick Lowery walked altarward last summer with Emily Hall, daughter of Mr. and Mrs. Lewis R. Hall of Framingham, Mass. Dick and his bride are now living at 213 LaFayette Avenue, Colonial Heights, Petersburg, Va. — Eliot Bradford, VIII, was married on August 13 to Ann Brooke Knight, daughter of Mr. and Mrs. Merrill D. Knight of Upper Marlboro, Md.

Al Rogowski was married to Anita Bellows, daughter of Mr. and Mrs. Sidney R. Bellows. The wedding took place on November 10 in Providence, R.I. — Good luck, fellows, and *pax vobiscum*. — We do not want to get into the bimonthly habit, so let's all drum up some hot news to feed the hungry maw of this voracious column. If we don't, paw will be mad. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, Chile Copper Company, Chuquicamata, Chile, S.A.

### 1935

With regret we record the death of one of our classmates, Harold T. F. Davies of Hampshire, England. Harold, who was with us in our last year at school, had been in the Royal Air Force and was killed in action on September 9.

Bill I. Thompson and Dorothy Cupitt were married on November 15. Bill received his doctor of science degree at the Institute and is now working for the Standard Oil Development Company in Elizabeth, N.J.

Lee Reid, formerly of M. Reid and Company, Inc., is now a lieutenant in the Public Works Office, 1st Naval District Head, Boston. John Mooring, formerly of the Army, is taking graduate work at the Institute. Duane Davis has left Musicraft Records, Inc., and is with the Reynolds Metals Company in New York. — ROBERT J. GRANBERG, *General Secretary*, care of W. C. Voss, 9 Old Town Road, Wellesley Farms, Mass. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road, North, Chestnut Hill, Mass.

### 1937

Ernest A. Ferris, VIII, wrote to us from West Roxbury, Mass.: "Since leaving Tech in '37, I worked for the American



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Thermos Bottle Company for seven months and then returned to the Institute. I shifted my allegiance from Course VIII to II. I also got credit for three months spent in a national defense course in aeronautical engineering." On June 23, Ernest started to work for the Foxboro Company in Foxboro, Mass. He continues: "Last May 3, I had the privilege and pleasure of being an usher at the wedding of Dom Cestoni and Phyllis Kennedy at Winthrop, Mass. To the regret of Dom and me, no other Tech men were there; therefore the wedding went smoothly. At the breakfast which followed, we proceeded to drink toasts to members of the old gang.

"Another to take the oath was Al Reinhardt, II. Mrs. Reinhardt (Claire E. Burton) is one of those rare combinations of brains and beauty. Having seen her, I can attest to her beauty; and as for the brains, I think that a B.S. from Boston Teachers College, and M.S. from Tech in '38, and a fellowship at the Yale School of Biology and Public Health speak for themselves. By the way, Henry Rugo, VII, who introduced the Mrs. to Al, has been the recipient of the American Institute of Baking fellowship for three years. — Bert Bennison, VII, received his M.D. from Harvard Medical School. Martin Deutsche, VIII, has his Ph.D.

"John Pellam is still the same — bubbling over with energy and ideas. I'm sure that all the Course VIII men will be glad to hear that he recovered completely from the serious illness that necessitated his leaving Tech the middle of his senior year. Incidentally, Pellam's senior thesis was published in the *Journal of the Acoustical Society of America*. — Ray McFee worked for two years for the Geophysical Research Corporation in Tulsa, Okla., but is now back at the Institute as an assistant in physics. — Bill Harcum, VIII, is still with Sperry Gyroscope Company, Inc. He was back at Tech for a while, doing some special work with the cooperation of the Electrical Engineering Department. — As far as I know, Paul Stevens, VIII, is now working for the Eastman Kodak Company at Rochester, N.Y. Tony Sperduto has been smashing atoms with Robert J. Van de Graaff, Associate Professor of Physics.

"While I was taking the defense course in aeronautics last March, I bumped into Verne Frost. He had just left the aircraft industry on the West Coast and was going to work for Republic Aviation Corporation on Long Island. Verne told me that Johnnie Gallagher, VIII, is in the Army. — I was looking for a job at the Watertown Arsenal last February, and I met Norm Matthews, III, there. He was feeling extra fine 'cause he had just become a daddy. Norm is living in Belmont. His cousin, Eddie Bartholomew, II, is married and is still teaching at Tech. — Dunny Cohey, III, is a metallurgist with the Gillette Safety Razor Company in Boston. — Leroy C. Hutchinson got his doctor's degree in metallurgy in '40. — According to Duane Wood's brother, Duane is working for Lockheed Aircraft Corporation in Burbank, Calif."

November 15 saw the marriage of Rolf Schneider to Erdine Dirkman at Waban, Mass. And away back on June 22, Hal Headley and Jane Casserly announced their engagement in Akron, Ohio. Fred Claffee was married on October 4 to Roberta Niesley at Bridgeport, Conn. October 2 saw the wedding of William Titherington to Mary Booton at Fort Sam Houston, Texas; September 6 that of Jane Greenwood and Henry Heywood, Jr., in Boston; and October 6 that of Margaret Hull and Tom Hallenbeck in Newton, N.J. Karl P. Goodwin and Caroline Smith of Hyannis, Mass., announced their engagement on October 19.

Norm Birch is back on the fire with another fine letter written on October 21: "I spent yesterday at the National Metal Congress in Philadelphia and was inspired by meeting many old friends to sketch such divers meetings as I've been fortunate to have with some of the other four-year-outs. I saw Henry Guerke, our star two-miler, for the first time since leaving school. He's still with the Bethlehem Steel Company, with headquarters at the home plant at Bethlehem, Pa., but he has recently transferred from metallographic and laboratory work to technical sales and is starting out to learn the geography of Pennsylvania, New York, and New Jersey. Henry and I had mutual congratulations to offer; he to me for having a wife, and I to him for having not only a wife but a family as well. The addition is a girl, well along in her second year.

"I had an announcement to the effect that Allen V. Hazeltine became a bridegroom on October 10 in Washington, D.C. The Hazeltines can be found at 4115 Davis Place, Northwest. — I met Harry Goodwin a while back, in the Grand Central Terminal. Harry had added a few pounds but looked as impeccable as ever; he is with the Crown Cork and Seal Company in Baltimore. Harry has been married well over a year.

"I ran across Bill Austin once, in the shuttle train between Grand Central and Times Square, and we spent four minutes hanging to straps, posts, and other people while talking over the past two years. Bill is another of 'us married men' and is located in Bloomfield, N.J., where he is associated with the lamp division of Westinghouse — technical sales angle. Bill apparently does a lot of traveling.

"Sometime last spring, Cleon Dodge and I spent eight minutes on the 125th Street ferry talking over things in general and cars in particular. C. C. had been working somewhere west of somewhere and was on his way to start with the Vought-Sikorsky Aircraft Company at Stratford, Conn. He was breaking in a new Ford on the way. Wayne Pierce is likewise at Vought-Sikorsky, as was Art Hunt at the time. Wayne, I know, is still designing. He is in the War Department pool, as am I at present, but Art has become a wandering soldier, and I wouldn't guess as to his whereabouts now. — Al Haskell, I last shook hands with at our front door at about 3:00 A.M.

on New Year's morning, 1941. Al was with the Crucible Steel Company of America here at Harrison, N.J., much interested in the annealing of stainless steels at the time."

Dave McLellan is with the North Carolina Shipbuilding Company in Wilmington — from shoes to ships. This is a late flash, and I hope to have more details next month. — WINTHROP A. JOHNS, General Secretary, Route 1, Bellemead, N.J.

## 1938

We hear with deepest regret of the death of Abbott S. Maeder. He had been radio engineer for the Sperry Gyroscope Company, first in their California laboratories and more recently at the plant in Garden City, Long Island. Stricken with infantile paralysis, he died on September 21.

Erich Nietsch has recently collaborated with an instructor at the Naval Academy in writing a book entitled *Simplified Theory of Flight*. The 162-page book is unique in its field, inasmuch as it is understandable to a person without an aeronautical engineering background. Nietsch is now employed at the Glenn L. Martin Company in Baltimore as aeronautical vibration engineer, and is also a ground-school instructor for a civilian pilot course.

Frank Dowding was in Boston over Thanksgiving week end. He is a designer in the engineering department at the Texas Company's New York City office and is living at Tudor City. Jack Chapin, we hear, is on active duty with the Army somewhere in Louisiana. — A letter from Paul DesJardins tells us he is on duty in the Navy. Paul had been with Worthington Pump and Machinery Corporation in the Pittsburgh area until he was called last August. It's now Ensign P. R. DesJardins, Board of Inspection and Survey, United States Navy, Washington, D.C. This inspection and testing of naval equipment is very interesting. Frank Knight is also in Washington, we understand.

Cornelius Roosevelt is mine foreman at the Parral unit of American Smelting and Refining Company. His address is Apartado 85, Parral, Chihuahua, Mexico. This is his third year down there. He spent a year as engineer and a year as shift boss. The unit handles daily some 450 tons of the gold ore in the cyanide and flotation mills.

Carl Feiss is married to Alleen Kelly of Cleveland. Carl was at the University of Pennsylvania before coming to the Institute. He is now an assistant professor of architecture at Columbia, in charge of the planning and housing division. The engagement of Clinton Tylee, Jr., to Phyllis Ann Schipper of Newtonville was announced last September.

Louie Hull was in Boston a couple of weeks ago to attend the powder metallurgy conference at Technology. Louie, you remember, is with the F. J. Stokes Company in Philadelphia, and under their direction has become an expert on powder metallurgy. Louie brought news of our much esteemed and much sought-

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after Prexy. Latest is that Jack Wallace is in Tennessee. (Ed. Note: Don't write; Jack will be somewhere else by the time this is printed!) At present, Jack is with the new and improved Monocoupe Aeroplane and Engineering Corporation. How about it, Jack, drop us your forwarding address once in a while!

While Louie was in Boston, he saw Fred DuBois. Fred is with the Dewey and Almy Chemical Company just up the river, but none of us had seen him for ages. Among others that Louie was able to mention was Squirt Mehren, who is still in the California public eye. A little later, Johnny Burke dropped in on Boston. Johnny is one of those who are contributing their services to Uncle Sam's Army. (Remember how neat he looked in that second louie R.O.T.C. uniform?) Aberdeen Proving Ground is Johnny's post, and he's on the watch for any of you '38 men!

Fred Kolb made a quick business trip to Chicago just after seeing Johnny Burke (Fred says he didn't owe him any money either!), and at Johnny's suggestion made an effort to see Carle McEvoy. Fortified with Carle's address, and news of the cute little daughter who recently came to the McEvoy's, Fred still didn't get his social call on the calendar! How is the McEvoy family? — Did we tell you that there really was a professional reason for Fred Kolb's trip to Chicago? Of course, we all know about that super-duper reason in Wilmette, but aside from that, Fred went conventioning. He made a report at the Federation of Paint and Varnish Production Clubs convention. Why did a three-day convention require a two weeks' trip, Fred?

Here's some hot news from the Alumni Council meeting in November. Henry Phinizy came back into the fold; by formal action of the Council, Harry is declared a bona fide '38 man and forever safe from the rowdies of the Class of '39. — DALE F. MORGAN, *General Secretary*, 142 Woodland Avenue, New Rochelle, N.Y. RICHARD MUTHER, *Assistant Secretary*, Room 1-180, M.I.T., Cambridge, Mass.

## 1941

Uncle Sam has plucked two '41 men out of their nomad jobs with the Carnegie-Illinois Steel Corporation. Joe Myers received orders to report to Camp Polk, La., and has been there since October 9. Irv Koss has been assigned to the signal school at Fort Monmouth, N.J. Says he: "You omitted to say in the November notes that Kirke Marsh and Dick Langworthy are in England with an aircraft warning group. They were a part of the group that was reviewed by the king and queen, it is rumored." We had hesitated to say that Kirke and Dick intended to go abroad. Also from Fort Monmouth, via the *Army and Navy Journal*, came the news that John Murdock and John Renner have moved to Mitchel Field, Long Island, N.Y.

From Camp Lee, Va., Charlie Whitney writes of his assignment in Washington with the Office of Quartermaster General

in the water transportation branch. He says that Mike Sexton is in Hawaii with the Navy; Dick Levy is with the Navy in Portsmouth, N.H.; Johnny Gilbert is with the United States Maritime Commission in Washington, D.C.; and Henry Bartlett is with the Grace Line as a marine engineer.

At Fort Sheridan, Ill., Mert Richardson and Boris Miller are attending the school for cooks and bakers. What will Tech men do next! — Miller, now a lieutenant, is engaged to June Scholnick of Chestnut Hill, Mass. Doris Annette Pohlman is engaged to Joseph Garfield Anthony, now an ensign stationed at the Portsmouth Navy Yard. — John Victor Manget was married to Jeanne Carney of Beverly Hills, Calif. John is an architect with Robert and Company, Inc., and is temporarily located in Macon, Ga. John W. Meier, formerly of the Pratt and Whitney Aircraft Company, is now a lieutenant at the Springfield, Mass., armory. He is a metallurgist in the manufacturing department.

From a sick bed at Camp Lee, Va., Rog Finch tells of his assignment to the Jeffersonville Quartermaster Depot, Ind. — From the Naval Air Station in Alameda, Calif., Gene Crawford, now an ensign, writes of the prospect of a somewhat stationary assignment for a year or so.

A long letter from Ivor Collins gives us the low-down on the mechanical engineers. Ivor is doing drafting work for the Detroit Edison Company and expects to be moved into the field for some practical work before many months. He writes: "I'm still the hottest Ford booster in the Class, having had one of my own since early August. Also, I'm still unattached."

"Carl Aronsen didn't take the job offered him by the Babcock and Wilcox Company in Akron, but went back to the West Coast and is with the test gang at the Bethlehem Steel Company shipyard out there. He dropped in to see me on his way home in July, and we had quite a gabfest. — Bill Fox is with the test gang in the Fore River Yard, Quincy, Mass., and likes it very much. — George Brown, according to Bill, is also at Fore River, and Bob Montana is headed for San Diego."

"Dick Joyce is in Hartford with a book-binding machinery company. Jack Horner is with the Chrysler Corporation in Detroit. I ran into him quite accidentally — passed him on Woodward Avenue one night. I would have missed him if it had not been for the Totem Pole sticker on his back window. — None of those mentioned have, so far as I know, any definite matrimonial intentions, but I speak with no authority and reserve the right to retract the above statement at any time." — Seems to this Secretary that Ivor's last statement is a good one to apply to all these — as Reid Weedon calls them — "sewing-circle minutes."

The Cambridge end of this column sends the latest news from Mac McGuire. Mac is already becoming attached to his job as a stress analyst at the Vought-Sikorsky Aircraft Corporation in Strat-

ford, Conn. He wrote: "Would you mention in your column that I'd like letters from any of my friendly enemies who are inclined to write? I don't promise immediate replies, but I guarantee answers. My address is 60 Hill Street, Milford, Conn." That request goes for your Secretary, too.

Don Scarff blew in from Schenectady where he is on steel-mill panel tests with the General Electric Company, after spending three months at their Chicago district sales office and a few short moments talking with the Cambridge half of the secretarial force. Don says he'll get some more class news as soon as he stops working twelve hours a day.

An informative letter came from Ken Bohr, who was with the Remington Arms Company, Inc., as a civilian when the usual call upset the appletart. Now, after a short stay in the hospital, Ken is at the Lake City Ordnance Plant, Independence, Mo., where he is a transportation and communication officer for the Ordnance Department. The plant is run by the same Remington Company. Ken says he just sits behind a desk and answers a telephone. It must be a Bohr-ing life. — Bud Blake is still with the 16th Engineers at Fort Knox, Ky., and Bill Hooper expects to be in Panama with the Signal Corps.

Now for a short review of general locations. We have at Wright Field, Dayton, Ohio: Milton Abel, Horace Adelson, Charles Butt, Cliff Muzzey, and William Schwindler; at General Electric Company in Schenectady: Henry Anderson and Don Scarff; at Pearl Harbor, Territory of Hawaii: Wilson Compton; at Washington, D.C.: Charles Corliss, Stephen James, Harold Radcliffe, William Shyne, and Pete Sosa; in Cavite, Philippine Islands: Harry G. Whitman; in Boston and surrounding districts: John Cutler, Herman Lang, Lyle Pahnke, and Alan Smith; in Ohio: Al Gauvreau, Al Parsons, Richard Schmidtman, Ben Scott, and Dick Tindal.

Clayton Baer is at Syracuse, N.Y., with the Crucible Steel Company of America; Bob Butman is at Coral Gables, Fla.; Bob Bailey at the Institute; Tom Campbell at Craig Field, Selma, Ala.; Ken Bohr, Charles Cole, Fred Cole, and Edwin Sumner at Springfield, Mass.

Your Assistant Secretary, Bill Ahrendt, still struggling through the Institute, takes over the rest of the column. Back at M.I.T. this year with VI-A are: Art Covitt, Bob Edwards, Ray Ketchledge, Bob Mayer, Jim Pickard, Joe Quill, Roger Robertson, Irv Van Horn, Red Webber, George White, and yours truly. We occasionally see Walt Aker, Dick Bartlett, Al Bowker, Bull Folberth, Rudy Hensel, Gard Ketchum, Ed Kispert, Julius Kohn, Walter Lob, Donald McDonald, George Newton, Nathan Owen, Charlie Sauer, Jim Tyson, and George Vineyard prowling around these hallowed halls.

My erstwhile roommate, Paul Erlandson, was married to Betsy Hague on December 20. P.M. and Betsy are living in the vicinity of Camden, N.J., where the head of the house is a production en-



1941 Continued

gineer with RCA. — I had dinner one night at Tomcat Manor, where the proprietors, Zach Abuza and Adolph Bertsch, treated me to steak and to gobs of news about the boys. Zach is in the Boston Ordnance Department, working on small arms procurement. His associates include Walt Kryeski and Ed Beaupré, both of whom are procuring ammunition for the United States.

Norm Vandervoort left Pittsburgh to assume his duties with the Office of Production Management in Washington. This seems like a slick job for Norm. — Rog Blum, ever eager for more book learning, is enrolled as an ensign in the graduate school of the United States Naval Academy in Annapolis. Johnny Sexton is still with the Hartford Ordnance Bureau at Springfield, Mass.

Ken Tsunoda is employed by Artisan Metal Products, Inc., in Charlestown, Mass., while Pete Gilmer enjoys night life in the Big City while working for the International Telephone and Telegraph Corporation. — Paul Sanderson writes from Pittsburgh that his life is being enriched by philosophy, the symphony, a plastics course, and the artist's model he has dated on occasion. — Bill Kusssmaul demonstrates his military ability by drilling the negro troops at Aberdeen Proving Ground, Md.

Hank Avery, writing ordnance texts at Aberdeen Proving Ground, finds time to supply some dope on his fellow ordnance men. Ray Foster is in New York City working on ordnance procurement; Les Gott is a metallurgist at the Springfield Arsenal; Ray Harper is at Aberdeen

writing texts; Dave McNally is at Westover Field, Mass.; Mario Conti is doing automobile work at the Proving Ground; and Herb Moody is not in the Army yet.

George Bises, of the Ebasco Services, Inc., New York City, is still trying to get in touch with his thesis partner, Carl Stewart. Any reports may be forwarded to our bureau of missing persons.

The smiling face of Mason Downing, now a lieutenant, looked out of the Boston *Globe* recently. Mason is showing the exhibition of the Chemical Warfare Service on the Office of Production Management defense train which is now touring the country. — STANLEY BACKER, *General Secretary*, 46 Bicknell Street, Dorchester, Mass. WILLIAM R. AHRENDT, *Assistant Secretary*, The Graduate House, M.I.T., Cambridge, Mass.



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By the Staff of the Color Measurement Laboratory of M.I.T.

Edited by Professor Arthur C. Hardy, '18

This Handbook discusses the characteristics of light sources, the physical measurement of colored materials, and the laws of color mixture. It includes the recommendations of the International Commission on Illumination which are interpolated to wavelength intervals of one millimicron; and in addition many auxiliary tables and charts which facilitate the specification of color. The large page size (10" x 13") has been adopted so that the tables and charts may be read with maximum ease and precision. Pp. 87, including 30 drawings, 25 charts, and 24 tables. Price \$5.00

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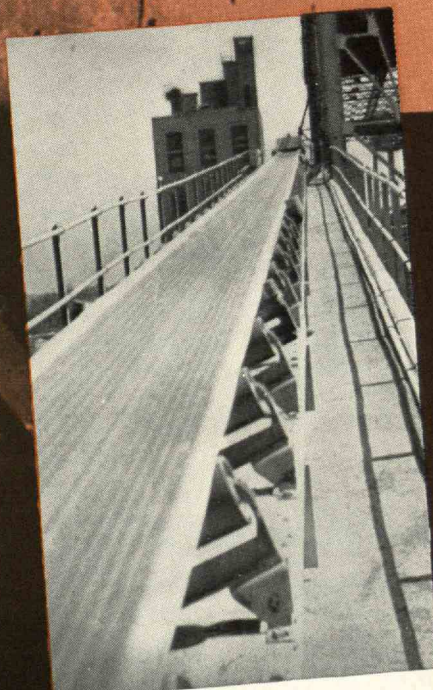
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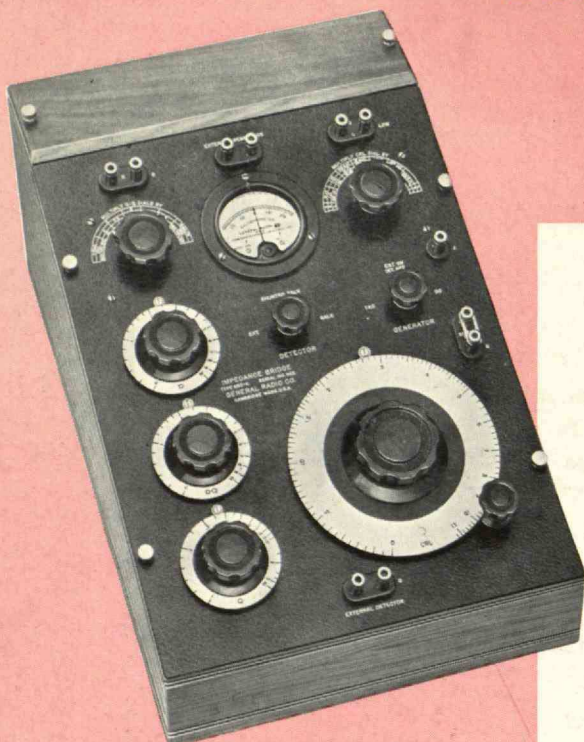
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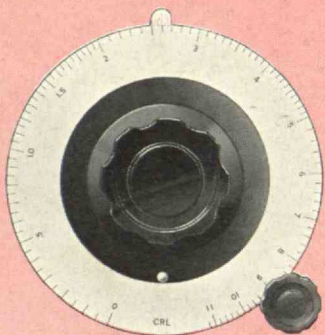


**Type 650-A Impedance Bridge, direct-reading over these ranges:—**

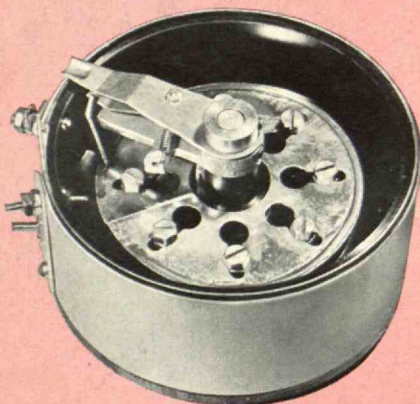
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**The CRL Dial with semi-logarithmic scale**



**The cam on the CRL potentiometer. The contact arm is not connected directly to the potentiometer shaft, but turns freely on it. At the outer end a spring is pressed against a follower which rides on the cam. The cam follower rocking up and down on the cam changes the angular position of the contact arm and the scale. Adjustment of the eight screws will take up all differences between individual potentiometers and the master potentiometer which itself is an average.**

IN research and production testing the convenience of having instruments read directly in the quantities they measure has been appreciated for some time by the manufacturer and the user of electrical measuring instruments. So rapid have been the improvements in most direct-reading instruments that they now have considerably greater accuracy than similar units manufactured several years ago without the direct-reading feature.

¶ In general, direct-reading scales are used only with resistors and capacitors; the accuracies obtainable are high, frequently as great as 0.1% of full-scale. In order to maintain high accuracy in a direct-reading instrument, *constant* fractional accuracy must be obtained and the rate of variation of the unknown should be logarithmic. In any *linear* scale the fractional accuracy decreases directly with the quantity varied.

¶ The circuit used with any direct-reading instrument has to be chosen so that the magnitude of the variable element is proportional to the unknown.

¶ One of the most interesting examples of a direct-reading instrument is the Type 650-A Impedance Bridge. This bridge measures five quantities over exceptionally wide ranges with the following *maximum* errors: for resistance, 2%; for capacitance, 2%; for inductance, 10%; for dissipation factor ( $R/X$ ) 20% and for storage factor ( $X/R$ ) 20%.

¶ For the measurement of so many different quantities and for the very large ranges obtainable from this bridge, four circuits and a number of multipliers are selected by two multi-position switches. The balances are obtained by the use of two of the four variable resistors.

¶ The semi-logarithmic scales on the four dials . . . the CRL, D, DQ and Q dials . . . are direct-reading. The potentiometers used with these dials are wound on tapered cards. The scales can be made direct-reading either by hand calibration of each point to fit the irregularities introduced by variations in wire size and spacing or these irregularities can be controlled to fit a pre-engraved scale.

¶ Originally the CRL dial of this bridge was hand calibrated with every line set to its proper resistance value. Later, the calibrations on a production lot were averaged and a master constructed. From this master calibration, other dials were engraved on a pantograph engraving machine. These dials are now photo-etched. In the quantities in which these instruments are now manufactured, it has proven much more economical to provide the CRL potentiometers with the photo-etched dial scale and to compensate for irregularities by means of a flexible cam, than to engrave each dial separately.

¶ Many other General Radio direct-reading instruments use resistors as the variable element. The dial scales are calibrated in a manner similar to those on the Type 650-A Bridge.

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